THE IRON AGE

Established 1855 New York, July 30, 1914 *Vol. 94: No. 5*

Theory and Practice of Sherardizing

Time, Temperature and Motion in the Process—Inspection and Cleaning of Products to Be Treated—Zinc Dust and Test for It

BY SAMUEL TROOD*

Concerning the practical side of sherardizing, the article to be sherardized must be regarded, first, in respect to its ability to absorb zinc vapor, and then the condition under which zinc produces vapor at the highest tension.

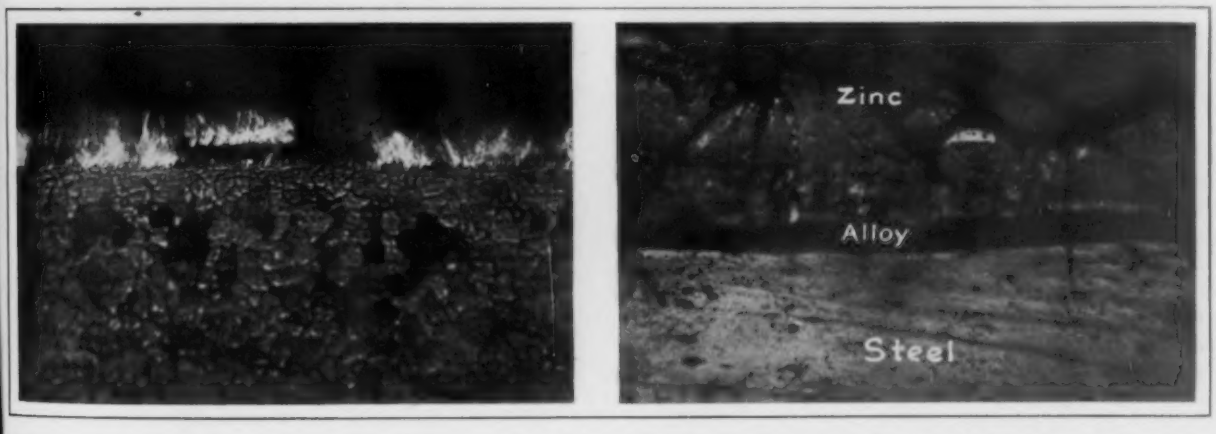
The articles to be sherardized are almost exclusively of iron in its different stages and forms, as cast iron, malleable iron, wrought iron, cold-rolled steel and steel in all its stages. Many kinds of iron articles have to be dealt with in many forms and stages and quite naturally they would have different rates of occlusion, due to the nature of the structure and form and quality of surface. The articles to be sherardized cannot be selected to any extent and the specifications under which the articles are being made cannot be changed without affecting their cost. Therefore, the most favorable condition under which the given article will absorb the most zinc vapor must be obtained. In some cases it will be a selection of temperature or pressure; in some cases it will be the treatment of the article, as annealing, or annealing under a reducing atmosphere, and in some cases, in the treatment of the surface, mechanically (sand blasting and tumbling), or chemically (pickling).

In the theoretical discussion, mention was made of the effect of temperature as an important factor to both elements of the process. In this connection it would be well to note that a critical point exists for the articles sherardized, for not all articles to be sherardized could be heated to the same degree without changing their physical properties. From this we see that the definite temperature for each special condition must be determined which is best for both the zinc dust and the treated article.

TIME AN IMPORTANT FACTOR

Just as temperature, so time is an important factor in the process of sherardizing. Since articles of different size, shape and character are treated, if each were given its ideal condition of temperature and quality of zinc dust, the time of treatment of all would be alike, but this is not practical, for it is easier to vary the time of the process than the other factors.

It is possible to obtain almost instantaneous sherardizing in the case of wire heated to a high temperature and allowed to pass through zinc dust at normal temperature. In the case of many articles to be sherardized this method is impractical and so longer periods of time are required. Not only the time of heating the article during the process should be considered but also the time of cooling, for this process is not confined to any one particular temperature, but takes place over a wide range of temperature. If the articles being treated have not become saturated during the heating period, the process will still continue upon cooling, until the temperature falls below its minimum point.



Photomicrograph at Left is Section of Sherardized Steel Magnified 100 Times; that at the Right is a Section of Sherardized Cold-Rolled Steel Showing Zinc-Iron Alloy, Magnified 1300 Times

*Consulting engineer, New Castle, Pa. What sherardizing really is, defining the process for the first time in a satisfactory way scientifically, was taken up in the first article by Dr. Trood, in *The Iron Age* of July 23. In the next article the typical sherardizing plant will be described and illustrated.

There are two reasons for slowly cooling: First, to prevent loss from exposing hot zinc dust to the atmosphere (the metallic zinc particles would quickly oxidize); second, to prevent the articles being chilled too quickly.

MOTION DURING SHERARDIZING

Sherardizing can be and is being done where the articles to be treated are placed in the zinc dust, heat applied, but no motion given to either the dust or the articles during the process. This method is used in the case where large pieces, plates and sheets are being treated. If the transmission of heat through zinc dust were perfect and if the deterioration of the zinc particles were negligible, the motion of the articles during treatment would be unnecessary. Such, however, is not the case, for zinc dust is a poor conductor of heat and the deterioration of the zinc particles in intimate contact with the article treated requires a replacement of the same by new particles. Since this process continues during the cooling period, until it reaches its critical point, where it ceases, the motion will produce the same effect then as during the heating period.

Since the process of sherardizing is being carried on all over the country under different conditions and for different purposes, it is impossible to give any specific rules for sherardizing. The following suggestions, however, can be applied in general to all plants using this process.

WHEN ARTICLES CANNOT BE SHERARDIZED

The process of sherardizing can be divided into the following steps or stages, each of which has a definite relation to the whole:

1. Inspection.
2. Cleaning or preparing of surface.
3. Zinc dust.
4. Temperature time.
5. Equipment.

As said before, the articles to be sherardized cannot be selected without increasing their cost, but this does not mean that everything can be sherardized. If the article is excessively corroded or covered by inburned slag (sometimes found with malleable iron) to such an extent that ordinary methods of cleaning will not remove it, it will not be advisable to attempt sherardizing. In this case such articles should be removed on inspection. Many people were of the opinion when taking up this process that anything would sherardize regardless of the condition of the surface, and this is the prime cause of the dissatisfaction at the introduction of the process.

Just as in the electro galvanizing and the hot galvanizing processes, so in sherardizing, the surfaces must be thoroughly cleaned. A hot galvanizer or an electroplater would not think of galvanizing an article that was not free from scale, rust, grease, dirt or other impurities, and it is also important that this is done in sherardizing if satisfactory results are desired.

DUST FROM THE ZINC SMELTER

There are two kinds of zinc dust on the market for commercial purposes, Grasselli and common blue dust. Blue dust is a by-product of a zinc smelter and is mostly imported from Belgium and Germany. Grasselli dust is manufactured in this country from metallic zinc. The zinc dust should be kept dry and if new zinc dust is used it should be dried out for several hours in the sherardizing drums at 100 deg. C., slowly rising up to 250 deg. C.

The blue dust can be used with a lower metallic percentage. Less time is required for the run in the oven (5 to 6 hr.). The quality of coating is better, as it is more uniform and solidified. Black spots are practically eliminated. There is no danger of fusion, bailing, balling and caking, irrespective of the various high temperatures. High temperatures can be used.

The drums, however, cannot be opened when using blue dust until a relatively low temperature has been reached, due to the very quick oxidation and danger of ignition. A longer period is therefore required for cooling. There are difficulties of handling this dust without a proper ventilating system and adhesion of loose dust to threaded and knurled surfaces occurs.

THE USE OF MANUFACTURED ZINC DUST

A brighter metallic coating is obtained than with blue dust. Less time is required for cooling and less danger is encountered in opening the drums when hot.

A higher metallic percentage is, however, necessary and a longer time is required for the run in the oven. There is also danger of fusion of zinc due to slight overrunning of temperature.

ZINC DUST TEST

To prepare permanganate of potash titrating solution (it is not a clarifying solution) weigh out 5 g. of pure fresh permanganate of potash crystals—weigh accurately—dissolve in 500 c.c. of pure distilled water at 60 deg. F. or thereabouts, i.e., upset the crystals into a dry glass stoppered flask and then fill up with water to the 500 c.c. mark. Do not put the water in and then the crystals afterwards, which would make the solution one to two per cent. too weak. Place glass stopper in position, shake well till dissolved and then store in a dark cupboard. It will keep for about a fortnight or so, but for competitive or buying or selling samples where extreme accuracy is wanted always make up a fresh solution.

Welgh out from a previously carefully selected sample of zinc dust, 1 g., weighing same to a hair; suspend in about 2 in. of distilled water in a glass beaker 3 in. in diameter—beaker large enough to hold a pint. Add to this 12 to 20 g. (according to presumed metallic value of dust) of pure ferric sulphate, and stir it and grind it with a glass rod for 20 min. off and on till all the zinc dust and all the ferric is dissolved with the exception of a few possible impurities at the bottom. Test these, however, by grinding them with the glass stirring rod and hold beaker up to a strong light and looking through it from the bottom and if any action (bubbling or movement) is seen on these impurities, give the solution a little more time to dissolve them. Then add another inch or so of pure water to save intense heat when acidulating, then add 25 c.c. strong sulphuric acid C. P. (for ordinary shop work good soft clean tap water if free from organic matter, and good quality commercial acid will do). Stir the acid in.

Before adding the acid the solution is of a rusty orange color. After adding the acid the solution is of a light emerald color.

Having done this, take a 100 c.c. graduated measuring glass tube, with a cock at the bottom, i.e., about 9½ in. high and 1⅛ in. or less in diameter and graduated by centimeters from 0 to 100 c.c., and fill it up to the 100 c.c. mark with the permanganate of potash solution.

Gradually pour this into the zinc solution. At first the pink color will almost instantly disappear, then go slower and hang cloudy. *Keep stirring* all the time until the end, i.e., when the last drop or

two added and well stirred will just turn the whole solution throughout a pale salmon pink. Then stop. Read off from the glass how much of the solution was used and multiply this by 1.0364. The result will be the actual metallic percentage of the zinc dust.

Example: 49 c.c. of solution used to give the pink color. Then $49 \times 1.0364 = 50.7836$ per cent. metallic zinc. Thirty to 40 per cent. dust will do with 12 to 15 g. ferric. Over that make sure by giving it 20 g. ferric. *Excess does not harm.*

TEMPERATURE AND TIME

Temperature and time are factors which, depending upon each other, are very important in the process of sherardizing. They depend on the choice and quality of zinc dust used and also on the requirements and physical properties of the sherardized material.

Little can be said in regard to equipment unless the articles to be sherardized are determined. If there are bolts, nuts, washers, stampings, forgings or articles of malleable cast iron, the equipment would be very different than in the case where large railroad material, structural iron, etc., are treated, or where continuous sherardizing is applicable, as with wire, woven wire cloth, nails, sheet metal, chains, etc. How to sherardize smaller work, such as mentioned above, will be described later.

(*To be continued*)

Record Coal Output in 1913

The production of coal in the United States has again broken all previous records, the output for 1913 being 570,048,125 net tons, which is considerably more than double the production of 1900 and more than eight times the production of 1880, according to a statement just issued by the United States Geological Survey, from figures compiled by Dr. Edward W. Parker, coal statistician. The value of the coal mined in 1913 is given as $760,488,785. Compared with the previous year the output for 1913 shows an increase of 35,581,545 tons, or nearly 7 per cent. The increased activity indicated by these figures was well distributed throughout the 29 coal-producing States, 23 of which showed increases and only 6 decreased production, the decrease in one of these, Colorado, being due solely to labor troubles. Twelve of the states showing increases made record yields.

Pennsylvania mined more coal in 1913, both anthracite and bituminous, than in any previous year in the history of the industry. The production reached the enormous total of 265,306,139 net tons, valued at the mines at $388,220,933, which is one-fifth of the world's output. Of this 91,524,927 tons was anthracite, valued at $195,181,127, and 173,781,217 tons was bituminous, valued at $193,039,806. The total tonnage broke the previous record for 1912 by 19,079,053 net tons, or nearly 8 per cent., the proportionate increase being about the same for both anthracite and bituminous. The gain in the value of anthracite, however, was $17,558,501, or about 10 per cent., over 1912 and in bituminous coal $23,669,309, or 14 per cent. The total gain over 1912 was $41,227,810, or nearly 12 per cent.

Except for the great floods of 1913 Dr. Parker estimates that from 5 to 10 million tons of coal would have been added to the year's total output. The demand for coal for blast furnaces and steel works shows a normal increase.

Representative men in blast furnace, steel works and rolling mill operations will be named to cooperate with safety experts of the Pennsylvania State Department of Labor in the framing of uniform regulations for safety at such plants. About twenty committees representing various lines of industry have been named by the department and their drafts of regulations will be submitted in the latter part of the year.

A Small Bevel Gear Generating Machine

A small size generating bevel gear planing machine has been developed by the Gleason Works, Rochester, N. Y. It follows in general the construction of the builder's line of two-tool gear generating machines, but is intended for making smaller bevel gears of the finest pitches. It is mounted on

A Recently Developed Small Size of Bevel Gear Generating Machine

a pedestal which is integral with an oil pan, and there are several new features incorporated in it to facilitate rapid changing of the work. The machine will handle any bevel gear having a cone distance of not less than 2⅛ in. and a ¾-in. face. The largest pitch recommended is 8 diametal pitch, and the smallest for which the tools are made as standdard is 32. It is possible to cut smaller pitches, but the extent to which this can be done is limited by the fact that the tool must have sufficient thickness at the point to stand up to the cut.

A rack and pinion with a lever and a micrometer stop is supplied for shifting the head to any desired distance from the cone center of the machine. When the distance from the apex of the gear to the back of the hub is known, it is simply necessary to set the micrometer stop to this distance and then bring the head up to the stop, the locking being accomplished by a single lever. The use of tool gauges is simplified considerably by a limit gauge which is 0.0005 i . over and under the desired length, with a separate gauge for the pressure angle. The machine will generate a tooth in 4 sec. as a minimum and 40 sec. as a maximum. The extremes of tool speed are 400 and 120 strokes per min., and a slip gear arrangement is provided for throwing the tools out of gear while making changes.

The indexing mechanism, which is positive in action, runs in an oil bath, as does the feed mechanism. Square gibs are used for all of the wearing surfaces and the shaft bearings have bronze linings. The net weight of the machine is 1250 lb. and a floor space of 32 x 44 in. is required. An oil pump for flooding the work while the cut is being taken forms a part of the regular equipment of the machine.

NEW TURRET SCREW MACHINE

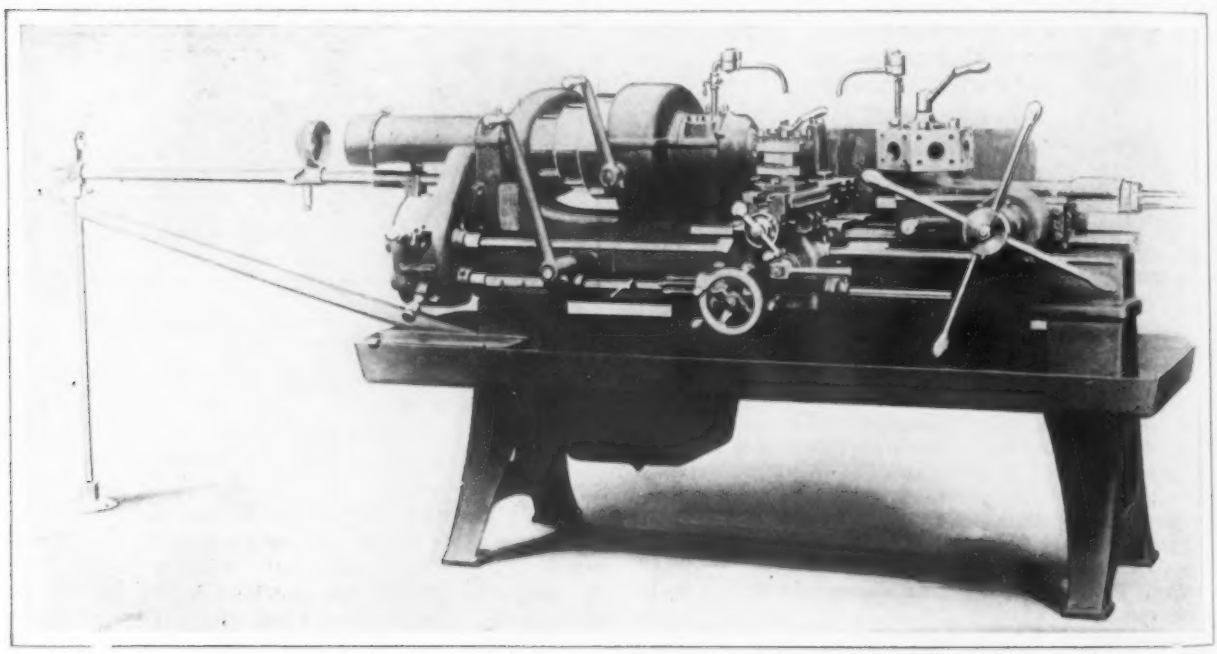
A Universal Machine for Manufacturing Duplicate Parts from Bar Stock

A new turret screw machine known as the No. 4 universal turret screw machine, designed for the manufacture of duplicate parts from bar stock, castings and forgings, with simultaneous power operation of both carriage and turret and other interesting new features, has been brought out by the Warner & Swasey Company, Cleveland, Ohio. The power longitudinal and cross feeds for the carriage make it a distinctly universal machine. As many as 11 tools can be used at one time, and the machine is claimed to be equally adaptable for manufacturing in large quantities or for the economical production of a small number of interchangeable parts. The machine has a capacity for bar stock up to 1½ in. in diameter and 10 in. in length.

Screw machines with power cross feed on the carriage are not uncommon, but this is the first machine to be provided with power longitudinal feed for the carriage. To add greatly to the possibility of working with the carriage and increasing the production, the carriage has a feed independent of the hexagon turret, being driven by a separate feed shaft, as in the company's Nos. 2A and 3A universal hollow hexagon turret lathes. Another important feature is the fact that the feeds of the carriage can be reversed entirely independently of the feeds of the turret, so that if necessary the turret can be fed toward the chuck while the carriage feeds away from the chuck. Two diameters can thus be turned at once or the outside of a piece can be turned with the carriage while the hole is being bored from the turret.

Another important feature is the arrangement in the carriage for chasing threads. A screw machine which can be used to chase threads from the carriage on large-diameter pieces is a decided advance over the ordinary screw machine, and thus considerably widens the field for the machine.

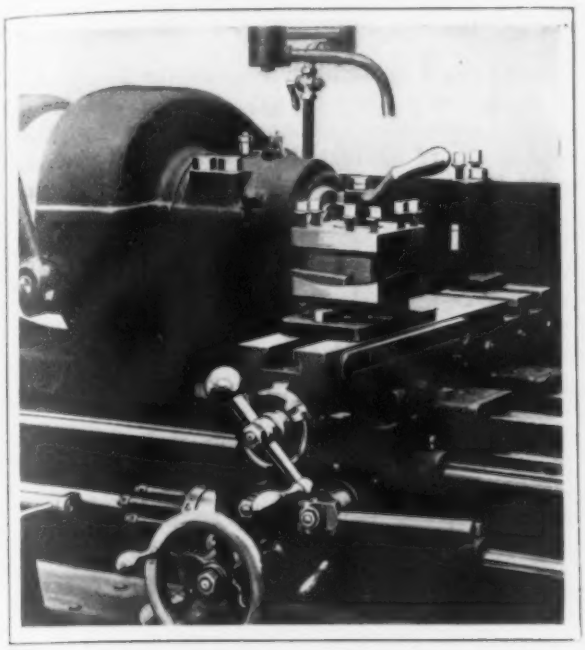
The head and bed are cast in one piece to insure strength and rigidity. Unless otherwise specified, the machine is equipped with the standard cone pulley drive, but a single pulley-driven all-geared head may be substituted, taking power from a plain tight and loose pulley countershaft, or driven directly by a motor. The machine illustrated in the standard cone-pulley drive type. The cone pulley of this type has three steps with ratios especially designed for the proper spindle speeds and the maximum power, the diameter of the steps being 6½, 8¾ and 11 in., the face of the pulley being designed for a 3-in. belt. In case a greater range of spindle speeds is desired, a triple friction countershaft is furnished. When this countershaft is used the driving cone pulley has steps 8½, 9¾ and 11 in. in diameter. The countershaft driven at 225 r.p.m. gives spindle speeds of 174 to 450 r.p.m., and with back gears, 35 to 91 r.p.m. With the triple friction countershaft, speeds of 150 and 334 r.p.m. give spindle speeds ranging from 115 to 435 r.p.m., and with back gears, 23 to 87 r.p.m. With an all-geared head a driving pulley 10 in. in diameter with a 2¾-in. face is used, and the six spindle speeds range from 36 to 450 r.p.m. These speeds and the reverse are obtained by sliding gears in the head operated by small levers in front. The geared head may be belted to a constant-speed motor of about 2 hp. placed at the rear, or be belt driven from a plain countershaft.



A New Universal Turret Screw Machine Designed for the Manufacture of Duplicate Parts for Bar Stock, Castings and Forgings and Equipped for Simultaneous Power Operation of Both Carriage and Turret

The spindle is a forging of high-carbon steel and ground to size. The bearing boxes are of special composition babbitt, carefully scraped and fitted. The bearings are straight, and steel adjusting collars and rings are provided for taking up the end thrust. Oil grooves carry the lubricant over the entire bearing surface of the spindle. The automatic chuck and bar feed, operated by a long lever on the front of the head, grips and releases the work instantly. With one movement the operator opens the chuck and feeds the bar stock without stopping the machine. A stepped wedge operating fingers provided with rollers to reduce friction automatically adjusts the collet for slightly varying diameters of stock.

The feed gear box provides the changes in the power longitudinal and cross feeds for the carriage as well as the power longitudinal feeds for the turret. Driving the turret and carriage by separate shafts is claimed to add greatly to the efficiency



The Carriage with the Cross Slide and the Square Turret

of the machine, as the feeds are thus independent and the proper feeds can be used for either. Feed changes are obtained by shifting the two levers on the front, each giving four feeds for the turret or the carriage. These are doubled by the pull pin at the end, thus providing eight feeds of wide range for each. The feed gears are of steel, assuring sufficient power for maximum cuts.

The carriage with the cross slide and square turret is of entirely new design. It spans the flat ways and is constructed for ease of control, strength and adaptability. The power longitudinal feed is engaged by the lever at the lower left-hand corner of the apron. The feed is thrown out by six independent adjustable stops carried on a stop roll, these acting as dead stops for gauging finished lengths. The carriage feed is reversed by a sliding worm. This is regarded as an extremely valuable feature, as it permits the carriage to be fed in either direction, and as the carriage is operated by a separate shaft, is is independent of the hexagon turret in rate and direction of feed. The power cross feed is thrown in by the short lever under the cross slide. The cross slide is operated by a ball handle and screw fitted with a large graduated dial and adjustable indicators for accurately gauging the depth of cut. When heavy forming cuts are taken the carriage may be locked to the bed by a binder handle. Two tool posts and a square turret are regularly furnished. The square turret, adapted for the use of four tools, is quickly indexed without lifting from its seat, and clamped in each position by the handle which operates the lock bolt and a central taper binding device.

The turret slide and saddle unit is of the builder's standard type. The slide has a length of feed of 10 in., which is extremely long for this size of machine. It has also a very long bearing on its saddle. The saddle is provided with a supplementary taper base and the slide is fitted with tapered gibs on each side, these being fitted for re-alignment of the turret after it has worn slightly, although it is not expected that any of these parts will need adjustment for a long time. The turret is a solid hexagon and measures 8½ in. across the flats. A hollow hexagon turret can be supplied if preferred.

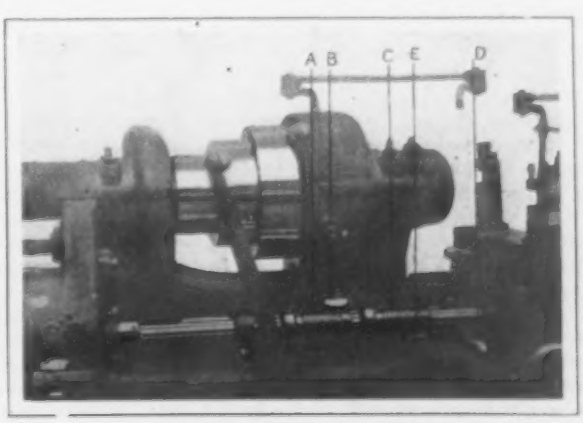
The turret slide is operated by turnstile, rack and pinion. The turret is automatically indexed by the backward movement of the slide, being held firmly to its seat by a large steel stud upon which it revolves. This stud is tapered, providing adjustment for wear, and is bored so that long stock can pass through the turret, thus allowing short stiff tools to be used. The lock bolt is of a special grade of steel, hardened and ground. It is operated vertically and locks into hardened and ground steel bushings. The locking is at the front end of the slide, almost directly under the working tool.

The tool holes in the solid hexagon turret are 1½ in. in diameter, with binder bushings for holding tools with round shanks. Each face has also four tapped holes for bolting tools directly to the turret. Tool holes may be bored to any special size specified. In the hollow hexagon turret the tool holes are 1⅞ in. in diameter, with a bolt hole each side of the tool hole.

The power feed to the turret is through a friction clutch, instead of the ordinary worm gear. Eight changes are obtained through the gear box, and are automatically tripped by the independent adjustable stops. These stops operate automatically for each position of the turret. They are threaded for their full length and are readily adjustable for the length of each cut. Each stop is provided with a binder screw for retaining its position when set.

The cylindrical arm of the taper attachment fits into a corresponding boss on the back of the bed. At the outer end of the arm is a T-block. The base of the attachment is bolted into the T-slots at the rear of the cut-off slide. To this base is fitted the tool block itself, this being in turn operated by the taper bar at the back. This taper bar is adjustable for tapers up to 3 in. per foot in lengths of 6 in. In doing taper work it is not necessary to disconnect the cross feed screw when turning tapers, as the taper is not obtained from the cut-off slide itself, but from the tool block of the attachment. This tool block is arranged for either inside or outside tapers. The taper attachment does not interfere with the operation of the hexagon turret or the square turret. Both cylindrical and taper work can be done on the same piece with the carriage without removing the taper attachment.

The chasing attachment for cutting threads from 3 to 32 pitch operates by means of a leader, A, and follower, B, quick return being effected by a leader, C, threaded in the opposite direction. A single lever, D, controls the followers for both leaders, thus governing the chasing feed and the quick return for the tool. By placing the chasing lever in its



The Chasing Attachment

horizontal position the chasing follower B is brought into engagement with the chasing leader A. When the thread has been chased the chasing lever D is lifted, thus bringing the returning follower E into

engagement with the returning leader C and throwing the chasing follower B out of engagement with its leader A. As the returning leader C and follower E are threaded in a direction opposite to that of the chasing leader and follower the carriage is thus returned to its starting point. It is not necessary to reverse the countershaft or spindle for returning the chasing tool to its starting point. Each leader and follower cuts threads in multiples of one and four of its own pitch. A micrometer screw attached to the cross slide provides a fine adjustment for the depth of cut. The taper and chasing attachments are furnished as extras. They greatly increase the working range of the machine and make it possible to finish work on this machine for which engine lathes were formerly required.

The oil reservoir is of cast iron bolted to the pan and fitted with a strainer to prevent chips from entering. A screw plug in the bottom provides a means of cleaning. A partition in the reservoir prevents sediment from entering the pump. The oil pump is driven by a belt from a pulley on the countershaft and operates when running in either direction. It delivers an abundant supply of oil, which is distributed by two pipe lines. The oil pan is of pressed steel.

The principal dimensions and specifications not given above are as follows:

Swing over bed, in.	16
Swing over carriage guides, in.	14½
Swing over carriage cross slide, in.	8½
Cross travel of carriage, in.	8
Longitudinal travel of carriage, in.	17
Turning movement of turret at one setting of saddle along bed, in.	10
Greatest distance from face of automatic chuck to turret, in.	23
Floor space of machine, approximately, in.	32 x 91
Net weight of machine, lb.	2,450
Crated shipping weight, lb.	2,650
Export shipping weight, lb.	3,175
Contents of case, cu. ft.	118

The machine is regularly furnished with geared friction head, automatic chuck and bar feed including master collet and one set of round bushings, carriage with geared power longitudinal and cross feeds, front and rear tool posts, quick indexing square turret tool post with rocker wedges, solid hexagon turret with independent adjustable stops and geared power feed, oil pan and pump, and double friction countershaft.

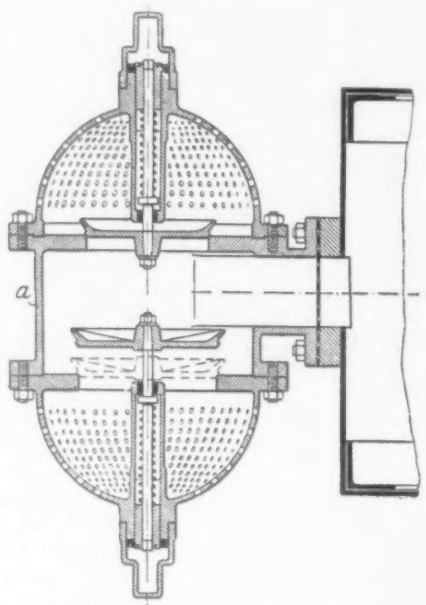
Oxy-Acetylene Welds

A paper on the strength of welds made by the oxy-acetylene process was presented at a joint meeting of naval architects and engineers held at Newcastle, England, July 8, by Prof. A. Campion and William C. Gray, of the Royal Technical College, Glasgow. The results of a series of repeated impact tests showed that the thicker the plate the less reliable was the weld and the greater the reduction in strength. Thick material also generally showed less improvement by annealing; in fact, under ordinary working conditions it was usually impracticable to anneal the material. As the result of a large number of tests and experiments upon autogenous welds, the authors came to the conclusion that, although there was a wide field of usefulness for oxy-acetylene and similar processes for joining or repairing steel plates, bars, etc., which were not required to resist very severe stresses, considerable caution should be exercised and due regard paid to all the conditions before making use of them. A very serious responsibility attended the use of autogenous welding in cases where the parts were likely to be subjected to considerable mechanical strain. Autogenous welds always represented a somewhat uncertain quantity, as there was no method, except by destructive tests, of ascertaining whether a weld was good or bad.

The production of sulphate of ammonia in Germany now amounts to 500,000 tons per year, 400,000 tons coming from the districts west of the Elbe.

A Device to Prevent Cupola Explosions

An article in Stahl und Eisen for February 26, 1914, by Franz Osswald explains a device for preventing explosions in cupolas. Apparatus hitherto used to guard against the occurrence of such accidents in foundry cupolas consists mostly of valves



German Safety Device to Prevent Cupola Explosions

in the blast pipe or on the wind boxes of the cupola, which are intended to weaken the effect of such an explosion. Or they sometimes consist of throttles in the pipes near the wind box, which become closed during the temporary shutting down of the cupola and are supposed to prevent the entrance of carbon monoxide into the blast pipes and its ignition, mixed with air, in the glowing cupola when the blast is again turned on. With this in mind the operators sought to prevent the cause of such explosions, the collection of carbon monoxide, by their instructions regarding the holding open of the blast pipe valves when the blast was stopped and started up again. But the satisfactory carrying out by workmen of such directions is not always easily attained.

The new automatic safety device, shown in the illustration, should overcome this difficulty. It consist of a perpendicular cylinder (*a*) attached to an opening in the windbox, which is closed top and bottom by a sievelike perforated hemispherical cap. In the lower part is a valve which is held open by a spring as long as the blast is off and which does not close until the blast pressure is equal to the weight of a column of water of 200 mm. Through the lower perforated cap and the open valve fresh air streams in while the cupola is not in operation, so that the carbon monoxide gases can burn. When the blast is again turned on the gases in the windbox are driven through the valve, which is still open, into the outside air and are rendered harmless. The gradually increasing blast pressure closes the valve and the blast streams through the tuyeres into the melting zone of the cupola.

The upper valve is held closed by means of a spring and opens only when the blast pressure mounts higher than is customary. This device offers a safety valve for all eventualities. Besides it relieves in certain cases the burden on the blast and the motors, for it assists a part of the blast to escape freely when there is a scorifying of the blast pipes or tuyeres. The device is said to be placed to the best advantage on the side of the cupola opposite the tapping hole.

High-Speed Multiple Drilling Machine

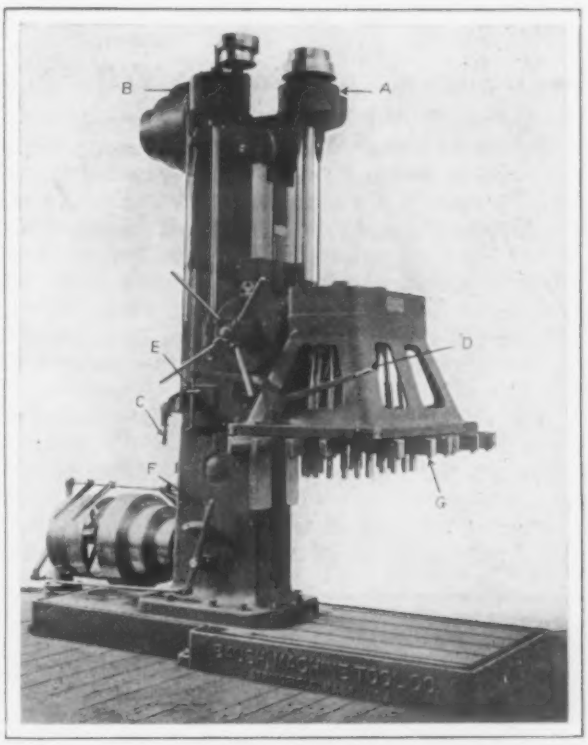
The Baush Machine Tool Company, Springfield, Mass., has recently developed a new design of high-speed multiple-spindle drilling machines. These machines possess a number of new features and are made in four sizes, the largest of which is the one illustrated. While, as will be noticed from the accompanying illustration, the machine is massive and rigid in construction, it is emphasized that at the same time it is very light and convenient for the operator to handle. The spindles are, of course, arranged so that they can be readily removed when they are not needed, so that only the necessary portions of the machine are in operation at a time. A number of conveniences are provided, so that the drills can be quickly set up for an irregular layout.

The main drive consists of a pair of spiral gears which are inclosed in the gear box A. The pinion is of steel and the gear is of bronze, and both run in a bath of oil. The weight of the vertical shaft and these gears is taken on a ball thrust bearing. Two cables and an equalizer provide for counterweighting the head of the machine. The cables pass over a safety locking device which is relied upon to keep the head from falling, should either one or both of the cables fail. A large recess is provided in the counterweight for the addition of any extra weights that may be needed to keep the head in balance when heavy drills and sockets are being used.

The feeds which are four in number are arranged so that two changes are obtained with a cone pulley, and this number is doubled by gearing in the feed gear box B. The gears are controlled by a jaw clutch which in turn is operated by a lever, C, located within convenient reach of the operator. The advantage of this arrangement is that if cast iron is being machined, the two coarser feeds would be used and the belt would be placed upon the step of the cone pulley which would give the desired rate. If, on the other hand, steel were to be drilled exclusively the belt would be set to give the two finer rates and ordinarily never changed. The lever D on the side of the machine which controls a swinging worm engages and disengages the feed. This worm is carried on a ball thrust bearing in a swinging frame, and both the worm and the worm wheel are kept submerged in oil. An automatic feed stop, E, is provided, and the head is returned by hand by manipulating the lever F at the left of the machine.

The head is rectangular and various sizes can be supplied up to maximum dimensions of 24 x 52 in. The arms and the spindles, which range from 12 to 40 in number, according to the size of the head, are adjustable in all directions within this layout, and there are no projections in the shape of lugs or bolts to keep them apart, so that it is possible to operate them on centers equal to the spindle nose diameter plus a slight running clearance. An independent ball thrust bearing is regularly furnished with the spindles, each of which has an independent vertical adjustment at G for different lengths of drills. The adjustment is controlled by a single screw on the extreme outside end of the arm, which makes a convenient arrangement. The main spindle gearing in the gear chest of the head runs in oil. Steel is used for all of the pinions, which operate in bronze bushed bearings.

As is shown in the engraving, the design of the post and bed is very massive. A return groove for lubricant, skimmer, weir and tank are provided for the bed, so that it is possible to attach the pump and supply pipe readily, if the character of the material being handled renders this necessary.



An Improved Type of High-Speed Multiple-Spindle Drilling Machine Having a Number of New Features

Working Hours in German Steel Plants

New regulations, which will come into force in December next, have been issued in Germany concerning the hours of labor in the heavy iron and steel industry, according to the London Iron and Coal Trades Review. They provide that: (1) The particulars required to be furnished as regards employees on overtime on ordinary days, or in any circumstances on Sundays or holidays, and also with regard to cases of emergency, in which the normal conditions as to intervals of rest, etc., are set aside, are to be sent to the factory inspector instead of to the local police. (2) The principal interval of rest must in the future be so fixed as to fall between the end of the fifth and the beginning of the tenth hour. Hitherto this interval, which must be of at least an hour's duration, has had to fall between the end of the fifth and the beginning of the ninth hour of the shift. This interval may be reduced exceptionally, but not below half an hour, by permission of the higher administrative authorities, in establishments where suitable rooms are provided in which men may take their meals near the place of work. (3) Where the shift exceeds eight hours in duration the minimum period of uninterrupted rest between two successive periods of work is to be increased from eight to ten hours. The period of work including overtime, between two such rest periods of 10 hours each, must not exceed 16 hours, including pauses. (This does not apply to double shifts worked at the time of changing shifts). Further, workers may only be employed in double shifts of 24 hours in length if they have periods of 12 hours' rest before and after such shifts.

Delegations from the National Hardware Association of the United States (wholesale), the National Supply & Machinery Dealers' Association, the Sheet Metal Club and from organizations in the wholesale dry goods and jewelry trades called on President Wilson on Wednesday, July 29. The interview was arranged to give the wholesale interests of the country an opportunity to present their views to the President on the business situation as affected by legislative proposals.

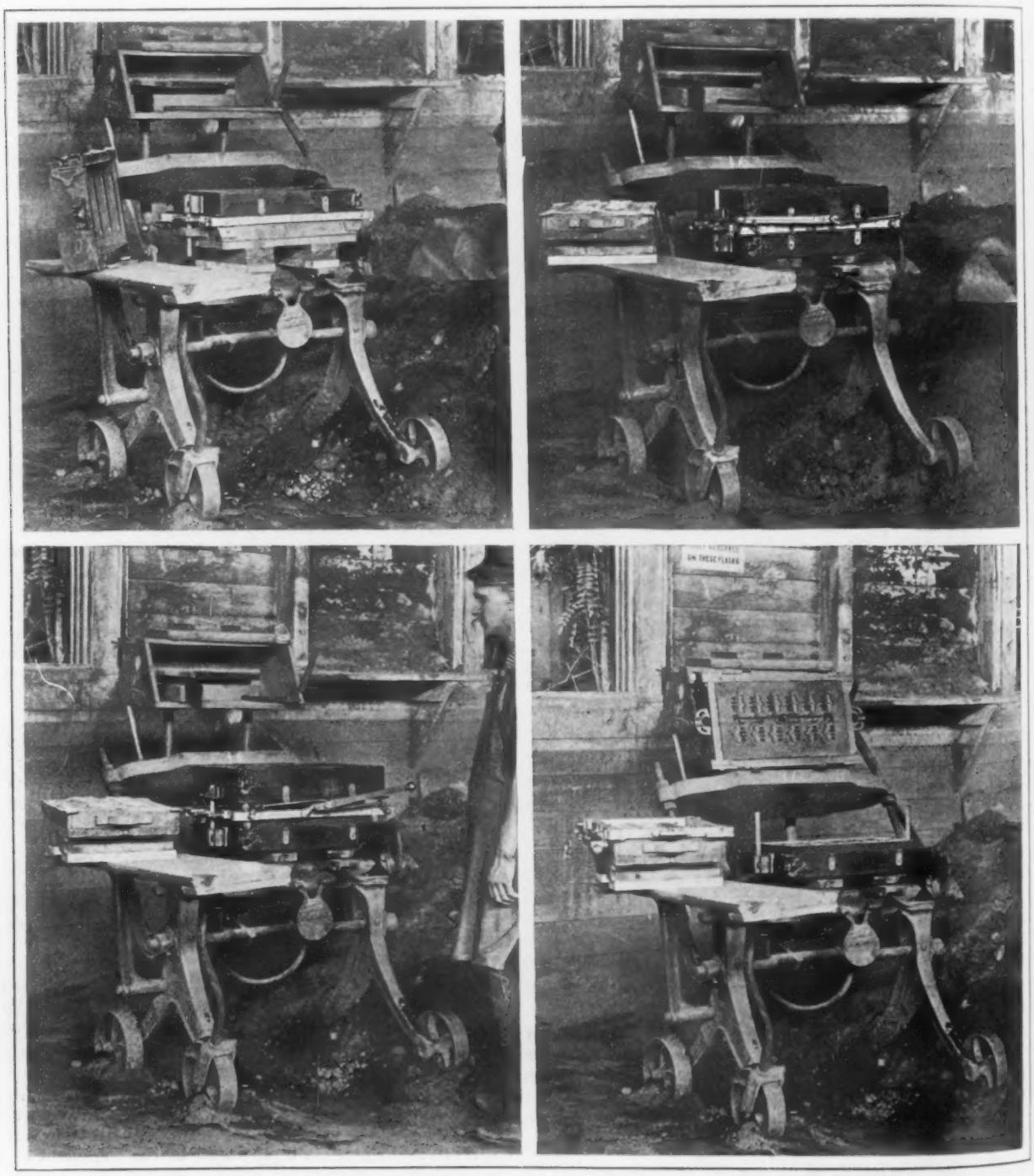
NEW TYPE MOLDING FRAME

The Combination of a Simple Pattern Drawing Mechanism with a Pattern Carrier

Frank J. Becker, Hamilton, Ohio, has patented an improved molding frame. It is intended for use with flask and solid mold frames, pattern carriers, match plates, or any type of cope and drag, and consists of a pattern drawing mechanism applied on the side of a pattern carrier of the ordinary type. The advantages claimed for the use of the frame are that the patterns are automatically drawn from the parting plane, perfect molds are made in a short space of time and the output of the shop is increased.

The frame is similar in construction to those of the ordinary type, except that it has a mechanical movement for raising the cope from the pattern, draws the pattern from the cope and drag or makes a complete lift and draw of the mold. The frame with a pattern mounted in it is illustrated in one of the accompanying engravings, while the successive stages in the operation of the frame are brought out in the other. As will be noticed from the engraving of the frame itself, there are sets of cam members in the corners which are controlled by a set of levers and links.

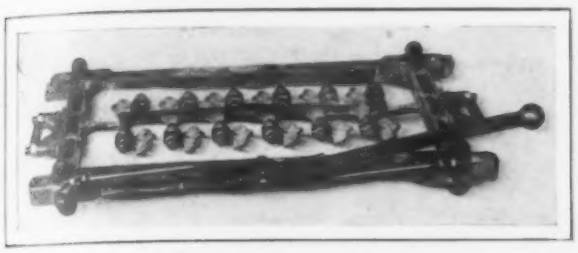
In use the frame is placed on the drag and both are mounted on a follower board. After the sand has been placed in the flask as shown in the upper left-hand corner the drag is reversed and the cope placed under the pattern in the molding frame. This is the position shown in the upper right-hand corner. The molder then moves the operating lever from left to right and first raises the pattern frame clear of the cope, and as the lever is moved still further the molding frame is raised still further from the cope, and at the same time the drag is raised so that there is sufficient space between the frame and the two parts of the flask, as shown in the lower left-hand corner, for the former to be removed without damaging the mold in the flask. The machine with



View Showing Successive Stages in the Operation of a Recently Developed Molding Frame

the pattern drawn is shown in the lower right corner.

An ordinary gate of patterns or a pattern plate can be used, and it is a simple matter to attach any



A Rear View of the Frame

gate of patterns to the frame, as it is handled like a flask. After a gate is completed another is attached, about 10 min. being required to change patterns.

A New Belt-Driven Ventilator of the Fan Type

A ventilator of the fan type placed on the market some time ago by the Burt Mfg. Company, Akron, Ohio, has recently been redesigned and improved, a belt drive being substituted for the former friction drive. This type of ventilator, which in its earlier form was illustrated in *The Iron Age*, September 28, 1911, is designed particularly for use in foundries and other manufacturing plants where difficult conditions are met with and where it is desired to remove smoke and fumes quickly. It is stated that it will remove 10 times as much air in a given length of time as the average stationary ventilator. A forced air draft is mehanically secured by the fan, which is located in the lower part of the ventilator. This fan is driven at a speed of 250 to 300 r.p.m. The ventilator is provided with a damper connected with fusible links which will break in case of fire and cause the damper to drop and shut off the draft.

Any one of four methods of driving the fan can be utilized, depending on conditions and convenience. One is an outside belt drive from a lineshaft over idler pulleys to the driving pulley connected with the fan. Another is an inside belt drive from the lineshaft and is used when the lineshaft is directly under the ventilator. Another drive is from a direct-connected motor in the housing on the outside of the ventilator. The fourth method is an inside belt drive from a motor conveniently located beneath the ventilator. The fan is equipped with ball bearings. The ventilator is made in four sizes, 24, 30, 36 and 48 in., and the power required to operate each fan is from ¼ to ½ hp. depending upon the size.

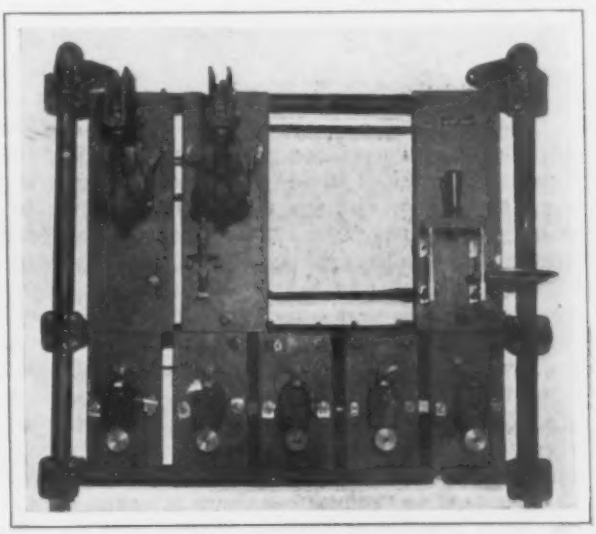
The Patterson Tool & Supply Company, dealer in machinery, tools and supplies, Dayton, Ohio, expects about January 1, 1915, to occupy two stores, 40 x 120 ft. in plan and 4 stories and basement in hight now being erected. This space, together with an additional building on the rear for a garage and steel warehouse, will permit this company to concentrate its machinery, tool and supply business under one roof. The thirty-fourth anniversary of the establishment will, it is expected, be celebrated in the new quarters. T. E. Fritch, vice-president and treasurer; W. R. Kemper, secretary, and F. B. Moorman, assistant secretary, recently celebrated their twenty-fifth anniversaries of entering the business.

Secretary Garrison announces that the Panama Canal will be open for commerce to vessels not needing more than 30 ft. of water on August 15, 1914. Probably the first vessel to pass through will be the Cristobal, a War Department steamer, now at Colon. There will be no formalities, all ceremonies being left for the official opening, when the international fleet will pass through the canal in March, 1915.

A Protective Panel for Electric Cranes

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has placed a new electric crane protective panel on the market. This is intended for use in connection with manually operated or non-magnetic controllers and serves a two-fold purpose, as it provides complete protection to the crane motors and electrical equipment from overloads, grounds and short-circuits, and also prevents injury to the workmen while making repairs by locking the line switch in an open position.

Each side of the line is opened and closed by a magnet switch controlled by a series relay in each motor circuit, and one in the common side of the main circuit. Should the current at any time rise above the setting of the relay the magnet switches are opened and the current is thus cut off. The use of relays on both sides of the line is relied upon to prevent them from failing to operate by reason of grounds. After the relays have operated they are automatically reset, but the magnet switches will remain open until a push button in the crane cab is pressed. In this way protection from the motors starting up unexpectedly is secured. A double-pole switch is used to control the line current, and this is arranged so that it can be locked open by padlocks inserted by the men at work upon



A Recently Developed Protective Panel for Use in Connection with Manually Operated Crane Controllers

the crane, and cannot be closed until all the padlocks are removed. In this way, it is pointed out, all danger to workmen from the current being accidentally turned on is eliminated.

Production of Fluorspar

The quantity of domestic fluorspar reported to the United States Geological Survey as marketed in 1913, according to Ernest F. Burchard, was 115,580 net tons, valued at $736,286, compared with 116,545 tons, valued at $769,163, in 1912, the year of largest output. The average price per ton for the whole country, considering all grades of fluorspar—gravel, lump and ground—was approximately $6.37 a ton in 1913, compared with $6.60 in 1912, a decrease of 23 cents. Fluorspar was produced in 1913 in six States—Illinois, Kentucky, New Mexico, Colorado, New Hampshire and Arizona—in the order named. About 80 per cent. of the domestic output of fluorspar is consumed as a flux in basic open-hearth steel furnaces.

The Maryland Steel Company has started up about half the plant of 126 Koppers by-product coke ovens which have been under construction at Sparrows Point, Md.

View of the Present Condition of the Old Ore Hill Mine, Near Salisbury, Conn., of the Barnum Richardson Co... is Shown ...

Historic Iron Ma...

Ore Mining Dating fr... lutionary Cannon a... Leading Up to a Mode...

BY E...

Historical interest and metallurgical interest are not often found combined in modern iron operations. The average one of to-day is developed from purely commercial surroundings and considerations. Iron mining, dating back to 1734 and continuing to the present day; an historic mountain-top furnace, from the pig iron of which the Constitution's anchors came; old forges that manufactured iron from which cannon ball and chain for our ancestors' army and navy were forged—an unbroken line of such operations leading up to modern mining and smelting is traced, connecting an organization of to-day with events that formed the ground work of its beginnings. It will probably surprise the average person to learn that in Connecticut there exists an iron ore and blast furnace enterprise, extensive in its scope, important in its product and intensely interesting historically.

The operations which led up to the formation of the Barnum Richardson Company, of Lime Rock, Conn., go back to very early days. When Connecticut was being settled by the colonists, the northwestern part was regarded as a wilderness. It was not long before iron ore was discovered which soon became the chief magnet which drew thrifty farmers, to a locality now known as Salisbury, a town in the northwestern portion of the state, and unknown to many of the colonists until about 1731. At this time the Colonial Assembly granted to Daniel Bissell, of Windsor, 100 acres of the ore bed in Salisbury, comprising the present Ore Hill mine. Since that time iron mining and smelting in some form or other has offered an occupation for a large majority of the people of that thrifty town, and in the early days it was the center of all that concerned the development of this industry.

The chief iron ore mines of this part of the state are located in the vicinity of the town of Salisbury and for many years the pig iron made from these ores has been known as Salisbury iron. The principal mines are known as Old Hill (now Ore Hill), Davis and Chatfield and are located on the eastern slope of the Tocconuc range of hills which are the foot hills of the famous Berkshire Mountains. The Davis bed is located near the village of Salisbury, the Chatfield and Ore Hill beds are about two miles southwest of it. It is estimated that the vein of ore of which these and other mines are a part extends from down in New York state to a considerable distance into Massachusetts and possibly Vermont.

The first ore was dug at Ore Hill. It was worked by hand as an open mine for many years by means of a number of pits carried into the side of the hill. This mine yielded the first ore between 1730 and 1735 and has since been worked constantly. It is estimated that between 1837 and the

Present Condition of the Weed Mine, Showing Extent of the Open Mining and the New Power House and Shaft for Underground Mining

g the Extent of the Open Mining Which Commenced Here About 1731. The Present Apparatus for Shaft Mining
t Center

g in Connecticut

—Forging Revo-
ors — Developments
coal Iron Enterprise

ONE

close of the civil war about 6000 tons a year were taken out. Since then this amount has greatly increased and the present estimate is about 20,000 tons per year. For many years this mine was controlled by an association of proprietors, owners of the mine, and a mining company who took out the ore. The former was paid a duty by the latter, who sold the ore to furnace owners. This was the arrangement until about 1898 when the Barnum Richardson Company bought out the association and still owns the mine.

Open mining has been discontinued. The ore is now obtained by mining to a distance of 1800 ft. under ground. The illustration which heads this article shows the extent of the operations at this mine since early in the eighteenth century. Near the right center is shown the effect of the principal open mining operation, while at the left center the present apparatus for shaft mining is shown, as well as the power house, the washers and the arrangements for loading into cars. The point from which the photograph was taken is about 200 ft. high and was made by dumping ore refuse year after year. The bottom of the old beds is about 200 ft. below the original level and they are about one-eighth of a mile wide by three-fourths of a mile long. Two other illustrations show the skip hoist and crusher at this mine, as well as the method of changing the ore from one skip to the other.

The nearest mine to Ore Hill is the Chatfield bed, where only open mining has been carried on. About 75 years ago 800 tons per year were taken out here, but the mine has been abandoned and practically nothing has been taken out for over 20 years. The third mine near Salisbury is known as the Davis and is situated about three miles from Ore Hill. Only open mining has been used here and its enormous pit gives an idea of the length of time it was operated. This bed is also owned by the Barnum Richardson Company, but has been abandoned for about ten years.

While there are other mines of more or less importance in this general territory only one is of interest so far as present operations are concerned. This is the one known as the Weed mine, located about 15 miles from Salisbury, just over the line in New York State. It was operated as an open mine 50 or 60 years ago when it furnished ore for the Millerton Iron Company, but it has not been worked for about 25 years, nor is the company any longer in existence. It is now owned by the Barnum Richardson Company, which is making active preparations to take out ore which will be smelted in conjunction with the ore now coming from the Ore Hill mine. The new operations will be entirely shaft mining and a new power plant is nearly completed at this

Skip Hoist and Crusher at the Ore Hill Mine

Method of Changing Ore from One Skip to Another

mine for this purpose. One of the illustrations shows this mine in its present state, the extent of the open mining being evident and the point being shown where the underground mining will start as well as the new buildings.

Another rather extensive mine, the Reynolds, located also in New York State near the Weed mine is owned by the Barnum Richardson Company, but it is held in reserve as a future source of ore.

The extent of the deposits of iron ore in this mining district are not really known, but it is probable that there are still many millions of tons more or less accessible. The ore itself is a brown dense hematite of very excellent quality and easily smelted. Before being reduced it is broken up by a Blake stone crusher and is then washed in an ore-washer. Analyses of the ore from the three principal mines will average about as follows:

	Ore Hill, Per cent	Davis, Per cent
Sesquioxide of iron	73.51	75.72
Sesquioxide of manganese	0.96	1.38
Silica	10.48	7.58
Sulphur	0.07	0.08
Phosphoric acid	0.57	0.03
Lime, alumina, water, etc.	14.41	15.21
Equivalent to		
Metallic iron	51.45	53.000
Metallic manganese	0.67	0.958
Sulphur	0.07	0.082
Phosphorus	0.25	0.014

In connection with these various deposits several furnaces were erected at different times in the early history of the development. They were located at Chapinville, Mt. Riga, Cornwall Bridge, East Canaan, Millerton, Lakeville, Lime Rock and Huntsville; many of these are now abandoned, but some remain as the nucleus of the Barnum Richardson Company.

The smelting of ore from these deposits dates back to very early times and some of the achievements in this line are very interesting. As early as 1734 a forge was erected in Lime Rock, Conn., the present headquarters of the Barnum Richardson Company, about five miles from the Ore Hill mine. This pioneer forge was built by Thomas Lamb and the ore that was used came from what was then called the Hendricks, but later the Davis mine. Iron was produced in what was called a refining fire similar to a blacksmith's forge in quantities of about 150 lb. at a time. Officials of the Barnum Richardson Company are proud to be able to exhibit a bar of iron that was made in the forge in the first years of its existence. It is in a surprisingly well-preserved condition, exhibiting scarcely any evidences of rust or deterioration.

About 1748 a forge was erected in the present village of Lakeville, then called Furnace Village. In 1762 John Hazeltine, Samuel Forbes and Ethan Allen, of Ticonderoga fame, purchased the property and built a blast furnace which is regarded as having been the first one in the state. A reproduced drawing shows a sectional view of this old furnace, which is said to have produced 2½ tons in 24 hours, the charge having consisted of 3 tons of ore and 250 bushels of charcoal per ton of iron. The blowing apparatus used for this furnace was a great contrast to the large blowing engines of the present day. It consisted of two large old-fashioned leather bellows driven by a water wheel, the shaft of which was provided with tuppets which engaged with a lug attached to a lever by which the bellows were operated.

A year after it was built this furnace was sold to Charles and George Caldwell, of Hartford, Conn., who operated it until 1768. It was then sold to Richard Smith, a royalist, who controlled it for some years, and ran it successfully until the revolutionary war began, when he left the country and the furnace without an agent. The colonial government then took possession of it, but did not confiscate it. Joshua Porter was chosen agent and employed 59 men. He proceeded to manufacture cannon, cannon-balls, shells, shot, camp kettles and swivels for the continental army. Some of the cannon produced were large enough to fire a shot of 32 lb. The guns carried by Commodore Truxton's ship the Constellation, also the ship Constitution, and those used at the battery in New York, are said to have been cast from this forge, as was also part of the large chain stretched across the Hudson River during the Revolution. The severe tests applied to the guns at that time in proving them established at this early period the high character of the iron for tenacity and strength. Governor Morris and John Jay were frequently on the ground as agents of Congress attending to the proofs and casting of the guns. Even after the war the navy was largely supplied with guns from the Salisbury region.

Though Lakeville was the site of the first blast furnace in Connecticut, there was another that was even more famous. On top of a mountain known as Mt. Riga, which rises 2000 ft. above sea level, there

Remains as they Appear To-day of the Old Historic Stone Charcoal Furnace on Mt. Riga Where Iron for Revolutionary Purposes was Smelted and Forged

was built about 1806 a furnace which in its time was important in its product and the ruins of which to-day are the mecca of many curious investigators. In 1781 a forge was built on this mountain by Abner and Peter Woodin, who were later succeeded by Daniel Ball. The works were known for many years as Ball's forge. Seth King and John Kelsey commenced building a furnace there in 1806, but being unable to finish it, it came into the possession of Messrs. Holley and Coffing, who completed it in 1810 and for many years carried on an extensive and profitable business in pig iron and merchant iron. Both this and the Lakeville furnace have long been abandoned.

From the original mine at Lakeville ore was carried in saddle bags on horses to the top of this mountain, 4½ miles from he mine by road and 1000 ft. above it. That such a wild and desolate as well as almost inaccessible place should have been chosen to locate a blast furnace has excited the wonder of many. But the top of this mountain supplied two very important essentials in making charcoal pig iron—water and fuel. The waters of a creek, confined by a dam, furnished plenty of motive power for the blowing engines and for operating trip hammers and other mechanical devices. The vast timber land furnished an almost inexhaustible supply of material for charcoal. With plenty of fuel and water, the matter of carrying ore four miles up a mountain seemed of minor importance.

The remains of this old historic stone furnace as it appears today are shown in one of the illustrations, together with a view of the lower interior part or evidently the place where the iron was tapped. The rocks which form the base of the stack near this opening are streaked with an enamel of many beautiful colors. It has the appearance of having issued from the rocks because of the intense heat. Those familiar with the region say that the rocks are of a strange composition, unlike anything else in that locality and claim not to know what kind of rocks they are.

Near this old furnace ammunition was made for the French and Indian wars and for the revolutionary campaigns. But the principal product of this locality, which has made it famous historically, are the anchors for the "Constitution," which were made from iron produced in this old stack. The old hammer head and base shown in one of the illustrations were used to make these celebrated anchors as well as later for musket iron for the United States armories at Harper's Ferry and Springfield, and also

Lower or Tapping Part of the Old Stack on Mt. Riga

Old Hammer Head and Base Used to Make Anchors for the Constitution

private armories. Cotton and tobacco screws, chain cable iron and mill irons were also outputs of this locality. It is stated that when the Greeks freed themselves from the Turkish yoke they received muskets made from the iron of Mt. Riga, as well as the large anchors for the two frigates built in New York for the Greek government. The finished products were hauled by oxen down hill again and across the country to the Hudson River, whence they were shipped by water to the various markets. They were even thus transported to Springfield, Mass., and Hartford, Conn.

The pig of charcoal iron shown in one of the illustrations was really cast in 1781 from the furnace at Lime Rock and is probably the oldest one in this country. It is always exhibited with much satisfaction by the Barnum Richardson Company.

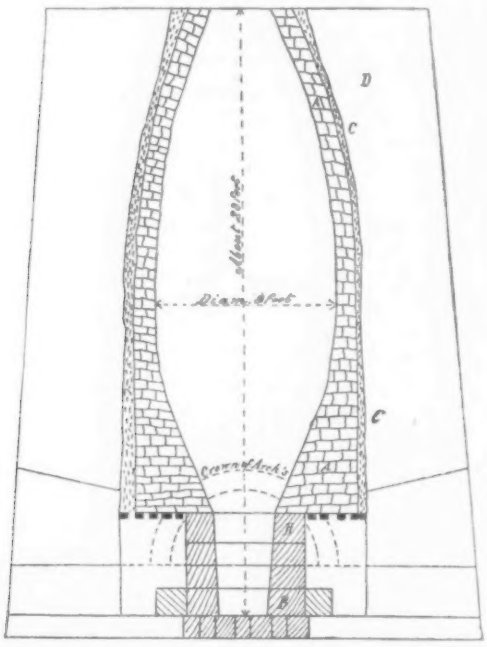
The iron interests of this section, which have been spoken of in the preceding paragraphs from largely an historical point of view, are now all vested in the Barnum Richardson Company, whose headquarters are in the beautiful village of Lime Rock, Conn. The founder of the company, Milo Barnum, established the business about 1830, associating with him his son-in-law, Leonard Richardson. This company, after passing through several changes in name and organization, is today in the hands of lineal descendants of the founders and it controls both the mining and manufacturing of Salisbury Iron. The person chiefly instrumental in increasing the business of this company was the Hon. William H. Barnum, for some years a congressman and United States senator from Connecticut and president of the company from 1864 till his death in 1889. The present officers of the company are C. W. Barnum, president; R. N. Barnum, vice-president and treasurer; M. B. Richardson, Jr., secretary, and S. W. Bradley, assistant treasurer.

The various iron mines that have been described are owned by this company, which, in addition, has three charcoal blast furnaces with a total annual capacity of 18,000 tons. Two of these furnaces are located at East Canaan, Conn., and one at Lime Rock, Conn. Ore from the Ore Hill mine and also from the Weed mine, soon to be operated, is transported by rail to East Canaan and by team to Lime Rock, a distance of five miles. The two stacks at East Canaan are 9½ x 40 ft. and 9 x 35 ft. respectively. At one of the furnaces the gas from the

One of the Charcoal Iron Blast Furnaces of the Barnum Richardson Company at East Canaan, Conn., as It Appears To-day

furnace is burned under the boilers and in all cases hot blast is used. The stack at Lime Rock is 9 x 32. One of the illustrations shows one of the East Canaan furnaces at is appears today.

An important branch of the business of this company is the manufacture of chilled carwheels, for which it has a foundry at Lime Rock, having a capacity of 80 wheels per day. For many years the product of this foundry has been used by one of the



Section of the First Charcoal Iron Furnace in Connecticut

large New England railroads and the iron itself is also consumed by several important roads that manufacture their own wheels. The company has a foundry for the manufacture of gray-iron castings, which is also located at Lime Rock.

For many years the Barnum Richardson Company produced all of the charcoal used at the furnaces from an extensive acreage of timber land, but the growing scarcity of wood for charcoal burning has seriously handicapped operations along these lines. At present all of the charcoal used comes from a large representative chemical charcoal manufacturer. Limestone of high grade is abundant in that part of the State. The charcoal pig iron produced is made in seven grades, Nos. 1, 2, 3, 4, 4½, 5 and 6. No. 1 is the softest and will not chill, while No. 2 is the softest grade produced in any quantity. It also will not chill and is used for making malleable castings. No. 5, a mottled iron, and No. 6, a white iron, are both very hard and will chill to almost any depth.

Pig of Charcoal Iron Cast in 1781 at the Furnace in Lime Rock, Conn.

Thomas Iron Company's New Ore Find

The new vein of iron ore recently discovered by the Thomas Iron Company at its Richard mine, Wharton, N. J., is 22 ft. 8 in. in width and thus far has been developed for a distance of 77 ft. along the vein. Ore in the center of the vein runs as high as 67.55 per cent. in iron and a sample taken all the way across it, including the mixed ore near the foot wall and also near the hanging wall, ran 58.99 per cent. in iron. The ore contains vanadium and titanium. At the Richard mine one year ago 300 men were at work. More recently, as blast furnace operations have been reduced, the force has been 140. This week, in view of the blowing out of the single Hokendauqua furnace the company has had in operation in recent months, all the men at Richard mine will be laid off except enough to keep the pumps running. One of the two small furnaces at Alburtis, Pa., is ready to go in blast and will be started up as soon as is warranted by the condition of the market and the reduction of pig-iron stocks on hand.

Training Employees in a Motor Car Plant*

Packard Company Educates Boys in Shop and Classroom, But Regards Work As Secondary to Training Able Departmental Executives

BY ARTHUR E. CORBIN†

The efforts of the Packard Motor Car Company to train its men to become more efficient, thereby increasing their value to themselves and to the company, may be divided into three lines of activity: namely—the practice given our apprentices in the operation of different machines, the instructions given the same apprentices in our classroom, and the broad and comprehensive work that is being done among the factory foremen and their assistants.

The demand for tradesmen in an automobile factory is so diversified that the Packard management has found it expedient to establish a number of different apprentice courses. We now have in our shop boys who have apprenticed themselves to become machinists, tool makers, die sinkers, pattern makers, electricians, body makers, body trimmers, or body painters. These courses are of three years' duration, and the boys receive 14 cents an hour at the beginning of their course with a semi-annual increase of 2 cents an hour.

At the present time there are about 60 apprentice boys working in small classes in the different departments throughout the factory. It is our purpose to increase the number by carefully selecting boys who may be recommended to us.

BOYS MUST PASS TEST AND ENTER CONTRACT

Before a boy is allowed to enter upon his apprentice course he must meet certain requirements. The boy must be at least 16 years old and have the equivalent of an eighth grade education. He must pass a physical examination at the shop hospital to make certain that he is sound physically and mentally. After the apprentice has been accepted, he and his parents enter into an agreement with the company that the boy will work diligently to complete his apprentice course. As a guarantee of good faith the boy and his parents deposit $25. Then to impress the boy with the seriousness of the contract he and the company's representative sign the indenture papers in the presence of witnesses and a notary public. One of the most important clauses of the contract is the one in which the company agrees to pay a bonus of $100 to those who satisfactorily complete their apprenticeship.

Another clause which also urges the boys to perform their duties faithfully is the one which guarantees a two weeks' paid vacation to those boys who, in the eyes of their instructor, have done commendable work.

Fully one-half of our apprentices are learning the machinists' trade. These boys are divided into classes and placed in charge of competent instructors. The grouping of the apprentices is a matter that has been given most careful study, and so throughout the factory will be found experienced machinists devoting their entire attention to five or six machinists' apprentices.

NOVICES WORK ON PRODUCT FROM BEGINNING

We have found it desirable to limit to six the number of boys placed under the instruction of one man. In this way we assure ourselves that the apprentices will not suffer from inattention because the foreman is too busy to give them much personal instruction, and that they are less likely to learn bad habits, mechanical and otherwise, from the thoughtless workmen in the shop. The divisions of the machinists' course are well defined, for every 6 months these apprentices are sent to a different department under another instructor, or on a different machine in the same department. The first 6 months are spent on drill presses, then the apprentice works on lathes for 6 months, then milling machines for 6 months, then at bench and assembly work for 6 months, and, finally, he spends 6 months reviewing the training of 2½ years. It is the purpose of the Packard Company to furnish the instructors for the boys, taking other apprenticeships just as soon as the number in the different courses will justify the added expense.

There seems to be a difference of opinion about the advisability of making apprentice boys produce work that is to be used in the finished article. It is the policy of the Packard company to require their apprentices to be producers from the first day they enter the shop. During the two months' trial period a boy is not trusted with work that demands very much skill. We trust the sense of responsibility which the boy feels when he realizes that he is helping to make a Packard car a credit to the company, puts him on his mettle, and he therefore tries to do the best work he can.

OLDER APPRENTICES TRAINING TO BE FOREMEN

There is another group of apprentices in the Packard factory that is composed of older men, many of them being graduates of technical schools, but most of them being men who have shown superior ability, both mechanically and executively; in other words—chosen because they are able men. It is the purpose of the Packard management to give these men ample training to qualify them to be foremen, and it is hoped that later on some of the company's executives may be chosen from among the special apprentices. Since these men are older than the regular apprentices their training is entirely different and they are thrown more on their resources. At the same time care is taken to make sure that the foremen of the departments in which they are working does not neglect to get in close personal contact with them. To accomplish this end only a few of the special apprentices are allowed in one department. The men in this course are more mature, and in consequence their work is more accurately and conscientiously performed, and they therefore receive a larger remuneration than the younger boys, they being paid 24 cents an hour. This rate is constant for the entire course, which lasts 120 weeks. The men spend 10 weeks in each of the following departments: drilling, milling, lathe, screw machine, gear-cutting, tool room (bench and machine) assembly, grinding, foundry and tool design.

TEACH DRAWING, MATHEMATICS AND MECHANICS

An apprentice school has recently been opened at the Packard factory to aid us in the task of

*From bulletin No. 5 of the National Association of Corporation Schools.

†Assistant sales manager, Packard Motor Car Company, Detroit, Mich.

teaching our apprentices to think. It is our aim to offer to the boys the best possible opportunities to educate themselves, and we have, therefore, carefull studied the practices in schools of recognized standing throughout the country. This investigation has led us to believe that 5 hours a week should be devoted to classroom work, and we therefore require our apprentices to spend 2 hours each week in the drawing class, and 3 hours studying mathematics and mechanics. The work in drawing is done in one 2-hr. period, while the mathematics' and mechanics' classes meet for 1 hour three times a week; and each boy therefore spends a portion of 4 days every week in the classroom. This we believe is more satisfactory than it would be to spend a full half day once a week in the classroom, because the boys have less difficulty in mastering the work when only a few points are presented to them at a time.

The classroom work is in charge of a man who has had a number of years experience in teaching and who is a graduate of one of our best technical colleges. The class is conducted in a large room on the fourth floor of the office building. The equipment for the work in drawing is designed for a class of twenty-five. Each set consists of a drawing table similar to the kind used in many drafting rooms, a drawing-board, and a complete set of drafting instruments. Besides the standard equipment there are larger boards for the use of the boys doing advanced drawing. In order that the work may be practical and applied as closely as possible to the design of an automobile, the boys make working drawings, or freehand sketches of different parts of the Packard car. An excellent set of machinists' tools is at their disposal, and they are required to take all their own measurements when making a working drawing of a machine part.

CLASSROOM WORK BEGINS WITH FUNDAMENTALS

Drawing begins with a few plates to teach the apprentices the use of drafting instruments, then the boys are given a little geometrical drawing. This is followed by the fundamentals of projections; and the major portion of the course is confined to making working drawings. Supplementary to this work is the practice in reading working drawings. A few of the more advanced students study cams and gearing.

The course in mathematics begins with a thorough review of arithmetic. The rest of the work involves the principles of algebra, geometry and mechanics, and is presented by many applications to shop practice. The boys are also taught to use the trigonometric functions.

We are encouraged by the determination which some of the boys show to master the work, and although the noon hour begins at 11.30 o'clock, many of them are so anxious to solve the problems in mathematics, or grasp the work in drawing that they study until 12, and often take the work home at night.

To stimulate the desire for good reading, we have a library of some of the best technical books, which is placed at the disposal of the apprentices. Besides our library, a branch of the city library is opened twice a week, and we urge the boys to broaden themselves by reading good books that are not technical.

CARE USED IN DEVELOPING DEPARTMENT HEADS

All this work of educating young men has been enthusiastically encouraged by the management of our company, but it is considered as secondary to the more important work of educating their departmental executives. Manufacturers are beginning to realize that as their business grows larger and competition grows stronger it is almost impossible to secure a sufficient supply of properly trained and efficient department heads, and our company has arrived at the conclusion that the only solution to the problem is to carry on a continual educational campaign among its present foremen and superintendents, as well as a few young men in minor positions, such as assistant foremen and gang bosses whom they will have available for filling any vacancies which might occur.

The educational work consists of a series of personal talks with the men. This work is carried on by our supervisor of labor, who devotes all of his time to welfare and educational work, and who is endowed with full authority to handle the labor situation and the educational work for the best interests of all concerned, and it is his duty to study each man individually. All of his good traits and habits, as well as his failings and weaknesses, are carefully noted. He is invited into a private room where 1 hour is spent in talking over the subject of departmental supervision. During the course of these talks reference is made in a very friendly but candid manner to all his failings, and suggestions are made which are helpful to him in correcting them. He is given very explicit instructions as to the proper method of handling his help; how to develop the unskilled into skilled, expert and efficient workmen; how to get them interested in their own future welfare as well as that of the company; how to develop loyalty and make each man in his department feel that he is an important factor in our institution, and that the company has a personal interest in him; how he should meet and instruct new men coming into his department and make them feel at ease and at home—tell them what he proposes to do for them and what he expects them to do for him. His attention is called to the folly of simply giving them a job and then leaving them to work out their own salvation, with the little help they may be able to get from the workmen around them.

Their attention is called to the importance of keeping efficient men in their departments for long periods of time; that their deportment positively must be such at all times that their men will respect them; that is, they must be sober, truthful, honest, busy, and, above all, punctual; that they must be the first man in the department in the morning and the last out in the evening; that they positively must keep faith with their workmen, and keep every promise made to them; that they cannot abuse them, or swear at them, and when it is necessary to correct them, to call them to one side and privately talk with them with all kindness but with candor; that if they will not respond to that kind of treatment they should dismiss them, but in doing so they should do it privately, give every reason for so doing firmly but briefly; they are told that our company's policy is to retain competent and loyal men, and that sufficient evidence of prejudice or bad temper against loyal workmen will be considered just cause for their dismissal, and it is especially urged upon them as one of their most important duties to train themselves to be affable, honest, straightforward, earnest, calm and always ready to assist and advise their men, both as to their duties and their personal welfare.

GOOD TREATMENT OF EMPLOYEES IS REWARDED

Our company believes that as our executives sow, so shall the company reap. For if they sow disorder and confusion among their men they will reap careless and dissatisfied men, but if they sow

kindness and interest in their men they should reap honest, loyal and interested workmen. Our foremen are told that the efficiency of their departments depends largely upon their ability as foremen to educate workmen and retain them in their department for long periods of time; and that if it were not for the educational work which they are expected to do among the inexperienced workmen, the company would have no further use for their service, except as workmen; for, if all of the men employed were skilled and efficient workmen they would need no mechanical foremen, but simply some clerical help to pass out the jobs to the workmen.

There was a time when our foremen were allowed to discharge any man who appeared to be incompetent, or perhaps lazy, but at the present time they are instructed to change these men from job to job in order to try to fit them into a place where their services would be valuable and satisfactory. If, however, they are unable to get them properly placed they must send them to the office of the Supervisor of Labor, who will transfer them to another department; or, perhaps, they are transferred a number of times to different departments until every means for finding a place where their services will be satisfactory has been exhausted, and they are not discharged until it has been proven to the satisfaction of the Supervisor of Labor that we cannot make men out of them. They are told that discharging men for ignorance does not relieve them of the responsibility or correct the evil, and that every time a workman is discharged it is necessary to hire a new man in his place who may make the same kind of mistakes, and thus the evil would go on indefinitely, or until the management discovered the foreman's weakness and dispensed with his services.

COMPANY WELL PAID IN ECONOMIES EFFECTED

The foremen are being taught to conduct their employers' business as they would if their own money were invested. They are given assistance in computing the cost of labor and material brought into and turned out of their department each day, also the cost of spoiled work. Comparisons are made between the expense of proper instruction and efforts that would have made good commercial material instead of scrap, and the cost of labor and material that went into scrap; and this alone has made such an impression that the company has been well paid for all the work they have done in the way of educating their executives.

All of these things apply only to the educational work done in the manufacturing departments, and are conducted entirely independent of the educational work done in our sales and advertising departments.

After these talks the foremen are closely watched for about sixty days and at the end of that time they are again called into the office and asked to go over the whole matter again and see what they have accomplished, and they are assured that this work is only the outcome of a desire to make each of them a greater and better executive.

This particular part of our educational work has been carried on for about one year, and the results have been extremely gratifying and remarkable—in fact almost unbelievable. Our foremen are quite enthusiastic about it, and there has grown quite a spirit of friendly rivalry among them, each one trying to outdo the other in efficiency.

An example of the success and importance of this work is seen in the turn-over of our force, which one year ago was about two hundred per cent., while at the present and for several months past, it has been less than fifty per cent. The efficiency of our plant has wonderfully increased, which is shown by the increase in our production, an improvement in quality, without any increase in our productive force, and a considerable decrease in our non-productive force.

DRY CLEANING OF FURNACE GAS

Comparisons with the Wet Process in Cost and Efficiency

The paper by Fritz Muller before the London meeting of the Iron and Steel Institute, May 7 and 8, on "The Development of Dry Gas Cleaning in Blast Furnace Gas Purification," an abstract of which was published in *The Iron Age*, May 14, 1914, while part of the discussion was given in *The Iron Age*, June 18, 1914, has brought some valuable communications to the London Iron and Coal Trades Review. Some of the essential points in these are reproduced here.

The first was from a correspondent, "X. Y. Z.," who considered a gas-cleaning plant for all the gas of blast furnaces, and particularly that required for gas engines, not an economical proposition. In his opinion £175 per 1000 cu. m. will not cover the capital outlay because generally new expensive gas mains have to be laid in order to make use of the gas saved through the installation of a cleaning plant. Besides there will be the cost of fitting new boilers with combustion arrangements. Probably the total capital outlay would be nearer £200 than £175 per 1000 cu. m. Taking interest and depreciation at 15 per cent., he thought £30 per year will be required for each 1000 cu. m. of gas per hr., and calculating the year as 8800 working hours, interest and depreciation will require an additional 0.765d. per 1000 cu. m., so that the total cost will be just above 2d. per 1000 cu. m., and assuming 4000 cu. m. for every ton of iron the expenditure for purification will be just 8d. per ton of iron.

EXPERIENCE AT DUQUESNE

Mr. Diehl, furnace manager of the Carnegie Steel Company at Duquesne, has published a detailed account of the saving at those works from cleaning the blast-furnace gas, showing it to be nearly 16c. per ton of iron, equivalent to 8d., indicating that apart from the convenience of cleaned gas, there is no profit in it.

Later, in reply to this, K. Huessner, of the Power Gas Company, Twickenham, England, stated:

Gas cleaning in itself does not pay for stoves and boilers unless particular care is taken to adopt a combustion arrangement which will give the best possible results. All that the Carnegie Steel Company obtained by cleaning its gas was to increase the efficiency of both stoves and boilers from 50 per cent. to about 60 per cent., and as the efficiency obtainable with uncleaned gas was calculated on cold gas without taking into account sensible heat, the actual efficiency at the Carnegie works when using uncleaned gas, calculated on the heat in the hot gas, would be even less than 50 per cent., so that it cannot be argued that conditions when using uncleaned gas, were exceptionally favorable ones.

EFFICIENCY OF UNCLEANED GAS

An investigation of the efficiency of uncleaned gas in a number of iron works showed that the all-over efficiency of stoves and boilers operated with cold gas varies between 50 and 54 per cent. An average heat balance sheet of a blast-furnace works heated with un-

cleaned gas, which, with a slight modification, would apply to a good many works, is as follows:—

Calorific value of 1 ton of coke	15,420,000 lb. cal.
Calorific value of cold gas per ton of coke	8,150,000 lb. cal.
Blast per ton of coke	97,000 cu. ft. of air.
Temperature of blast	1,100 to 1,300 deg. F.
Heat required for heating the blast	1,305,000 lb. cal. per ton of coke.
Heat required in stoves running at an efficiency of 52.6 per cent	2,580,000 lb. cal.
Heat available in cold gas for heat in steam	5,570,000 lb. cal.
Boiler efficiency	52.6 per cent.
Steam per ton of coke	4,900 lb. from and at 212 deg. F.

If for a plant of this kind the gas is cleaned and Terbeck furnaces installed, both at stoves and boilers, the results would be as follows:—The efficiency of the stoves would be raised to 70 per cent., so that the heat required in the stove would be 1,940,000 lb. cal., and the balance available for steam raising 6,210,000 lb. cal. An efficiency of 80 per cent. is easily obtainable under boilers fitted with Terbeck burners. The evaporation per ton of coke would be 9300 lb. from and at 212 deg. F., an increase of 4400 lb. = 1.96 tons of steam. Taking the value of steam at 1s. 3d. per ton, the saving will amount to 2s. 6d. per ton of coke. As one ton of coke will yield approximately 4000 cu. m. of gas, and the cost of cleaning at 2d. per 1000 cu. m., as given by Greville Jones, as well as by "X. Y. Z.," must be deducted, a net profit of 1s. 10d. per ton of coke remains. The profits to be expected from a plant dealing with 150,000 tons of coke per year will, therefore, be £13,700, which is an excellent return for the capital outlay, even if a dry-cleaning plant should be adopted.

There appears to be no difference in the working cost of a wet- and dry-cleaning plant, and the figures published on the Continent for wet-cleaning plants coincide exactly with what Greville Jones says and what is evident from the paper read by Mr. Muller.

In a later issue, Henry Lindsay, of Louis Schwarz & Co., Bradford, England, offered the following:

When comparing the results of dry cleaning with those obtained with the wet process, figures relating to out-of-date wet processes are invariably quoted. Modern wet cleaning requires less than one-fourth the amount of water necessary for old wet plants. Advocates of the dry process are entitled to make what can be made of super-cleanliness of the cleaned gas, but is this worth the extra cost? Higher degrees of cleanliness are easily attained in modern wet plants of relatively small dimensions, and it is difficult to justify the extra capital outlay necessary for still further purification of the gas beyond the degree of cleanliness of the ordinary air supply for engines, boilers or stoves. This view is endorsed by many unbiased authorities.

Some recently published remarks convey the impression that the dry process requires practically no power, but the fact that under similar conditions whichever system is used the fan power for conveying the gas along the mains is the same. The wet process requires, in addition to the fan power, power for the disintegrator cooling washer, while the dry process requires, in addition to the fan power, power for forcing the gas through the bags, for driving the mechanism, and in some cases for pumping water to pre-coolers and after-coolers not required by the wet process. A horsepower comparison of 2½ hp. per 1000 cu. m. of gas for dry and 3 hp. for wet cleaning is approximately typical.

RELATIVE COST FAVORABLE TO WET CLEANING

The fundamental question is relative cost, and this is favorable to wet cleaning. First cost for the two systems, including foundations and buildings but excluding such mains as are outside the plant, can be safely taken in the proportion of 7 for wet cleaning to 12 for dry cleaning. An average of four running costs published by permission of the makers of the dry process, including one case given by its inventor and taking full advantage of the supposition that the dust can be sold favorably in each case, works out at 2.2d. per 1000 cu. m. of gas. This figure is not exceeded by the modern wet process. A cost of only 1.4d. per 1000 cu. m. would usually cover wet cleaning for stoves and boilers.

The disposal of residue from wet cleaning is sometimes made to appear as an awkward problem, whereas with the dwarfed settling basins of the modern disintegrator system this part of gas cleaning is rendered easier, safer and much less disagreeable than the work of handling the whole of the dust in a dry state.

COMPULSORY PATENT LICENSES

Real Effects of Proposals at Washington as Inventors See Them

WASHINGTON, D. C. July 29, 1914.—The Committee on Patents has just reported to the House with a favorable recommendation an extraordinary bill professing to be a measure to "reform the patent laws," but which in fact embraces a series of radical propositions directed against so-called trusts, which the House Judiciary Committee refused to incorporate in the Clayton omnibus anti-trust bill and which, if enacted into law, would work a far greater injury to manufacturers of moderate means than to the giant corporations. The latter in many instances would be strengthened in their position of monopoly by these very provisions. The bill in question was originally drafted by Representative Oldfield, of Arkansas, chairman of the House Patent Committee, and it has been reported over the protest of the Washington Patent Law Association and other representatives of the patent bar of the United States, whose opposition has been strongly reinforced by manufacturers whose attention has been drawn to the matter. There is in the situation, however, great danger to the manufacturing interests of the country, for the reason that it is generally assumed that, the Judiciary Committee having abandoned these propositions, the present Congress will hear no more of them, while as a matter of fact they have been favorably reported by another committee in the hope that they may be quietly smuggled through the two houses in the hurry and confusion incident to the high pressure methods which are now being resorted to in the effort to complete the pending legislative programme.

The most important section of the Oldfield bill provides a compulsory license for patents which are not immediately worked by the owner. The desirability of this provision is based upon the unsupported assertion of the advocates of this measure that "some of the largest trusts of the country are founded almost wholly on patents and they have been able heretofore to exercise a free hand in acquiring and suppressing competitive patents." This "evil" is to be remedied by the following amendment to the patent laws:

That the district court wherein the owner of a patent or of any interest therein is an inhabitant or may be found, shall have jurisdiction to compel the granting of a license under such patent under the circumstances hereinafter set forth. The person applying for such license shall file a bill in equity setting forth briefly the facts and circumstances, and the court shall thereon hear the person applying for such license and the owner of the patent. If the applicant shall allege and prove to the satisfaction of the court that the patented invention is being withheld or suppressed by the owner of the patent, or those claiming under him, for the purpose or with the result of preventing any other person from using the patented process, or making, using, and selling the patented article in the United States in competition with another article or process, patented or unpatented, used, or made, used and sold, in the United States by the owner of the patent or those claiming under him or authorized by him, and also allege and prove that the application for said patent was filed in this country more than three years prior to the filing of such bill in equity, the court shall order the owner of the patent to grant a license to the applicant in such form and upon such terms as to the duration of the license, the amount of royalty, the security for payment thereof, and otherwise as the court, having regard to the nature of the invention and the circumstances of the case, deems just: Provided, however, that nothing herein contained shall be construed to authorize the court to compel the granting of a license by the original inventor who has not obligated himself or empowered another person to suppress or withhold such invention.

From the order of the district court granting or refusing such license, appeal may be taken by the party aggrieved to the circuit court of appeals in the same manner and form as in other cases arising under the patent law: Provided, that the provisions of this section shall not apply to any patent granted prior to the passage of this act.

THE INVENTOR AND SMALL MANUFACTURER HIT

This section is denounced by patent experts as a misguided attempt to strike a blow at the so-called trusts by a device which the House Judiciary Committee has rejected as both unwise and impracticable. The entire compulsory license plan, it is contended by the experts, is bad for the inventor, for the small manufacturer and for the public and is contrary to the spirit of the patent law. Inventors would find it impossible to dispose of their inventions to manufacturers unless the latter were in position immediately to undertake the production and marketing of the article in question. If there should be any delay in manufacturing under the patent a competitor would be free to demand a license and thus destroy the monopoly which the patent law is designed to give as a reward for the inventor's ingenuity and labor. From the standpoint of the small manufacturer, the compulsory license plan would be absolutely destructive. A rich and powerful corporation would be able to maintain exclusive control of a large number of patents by manufacturing, even at a considerable loss, a few devices under each patent, regardless of whether any sale for them could be found, whereas a small rival not only would be unable to protect valuable, temporarily unused patents by manufacturing under them, but would be obliged to surrender his rights upon the demand for a license presented by his powerful competitor, under the terms of the Oldfield bill. Many manufacturers with moderate resources have purchased from inventors a number of so-called "alternative" patents in order to protect a specialty which they are producing and marketing, and thus inventors find a constant incentive to exercise their ingenuity. The Oldfield bill would require such manufacturers to produce goods under every alternative patent controlled by them, thus forcing on the market many inefficient devices; otherwise, a rival with large resources would demand licenses covering all unused patents and through the use of advertising and superior selling and distributing facilities soon effect the ruin of his small competitor.

INVENTOR NOT TO CONTROL CONDITION OF USE

Another feature of the Oldfield bill of scarcely less importance is intended to nullify the decision of the United States Supreme Court in the celebrated case of Henry vs. Dick, in which the court held that the manufacturer of a patented article has the right to prescribe the conditions under which it may be used. This principle has been recognized ever since the first patent law was placed on the statute books, but the Oldfield bill proposes to sweep it away by the following enactment:

No person selling or otherwise disposing of any article manufactured under a patent shall have any greater right to prescribe, either by contract or otherwise, conditions limiting its subsequent disposition or use than if the article were not manufactured under a patent. No purchaser, lessee, or licensee of a patented article shall be liable to an action for infringement of the patent because of any breach of the contract of sale, lease, or license, or of any provision thereof. No person who obtains a license to use any patented art or process, or to make, use, and sell any patented article shall be liable to an action for infringement of the patent because of a breach of such license or of any provision thereof.

Until the movement which has resulted in the reporting of the Oldfield bill was set on foot it was generally admitted that it was a sound principle of law that any one could sell a patented machine with a proviso that it is to be used in one place only, for one purpose only, or for a limited time, and that a licensee who goes beyond his license is as much an infringer as if there had been no license. Such a licensee is, in fact, while using the machine which was sold him, invading the franchise of the patentee. This provision of the Oldfield bill, while claimed to be of general application, is understood to be directed almost exclusively against one or two corporations which sell certain machinery with license restrictions. This subject was fully argued before the House Judiciary Committee, which declined to take action in the premises because of its conviction that, while it might strike a more or less effective blow at one or two powerful industrial combinations, it would incidentally destroy a large number of individuals and corporations with modest resources.

The opponents of the Oldfield bill make the argument that the absolute integrity of the patent law is essential to the protection of the small manufacturer and they point to scores of notable instances of relatively small concerns keeping the field against powerful rivals and resisting all overtures to join combinations solely because of their possession of patents under which efficient machines or devices are being produced. Anything calculated to reduce the degree of protection enjoyed under the present law would, it is argued, tend directly toward monopoly and defeat the avowed purpose of the Oldfield bill. W. L. C.

Importers and the New Invoice Rules

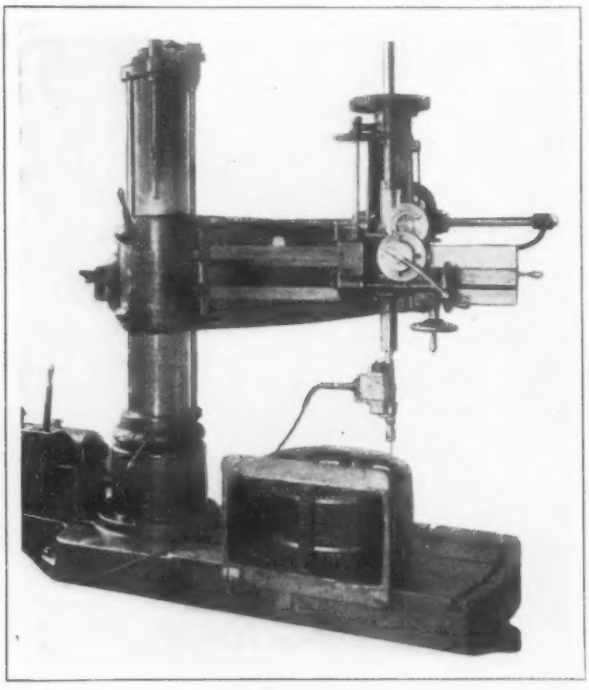
President Wilson's order of May 28, under which the consular regulations are so amended as to require American selling prices to be placed on consular invoices of imported goods when import orders have been taken prior to the shipment of the goods, continues to bring strong protests from importers. Some of the latter say that it is impossible to comply with these regulations and that their enforcement would mean throwing open their trade secrets. The difficulties attending the new regulations are keenly appreciated by the Custom House brokers, who state that very few importers fully realize the heavy burden that will be placed upon them if the new regulations are enforced. At a meeting of the Custom House Brokers' and Clerks' Association in New York last week the view was expressed that the new regulations were so harsh that it would be practically impossible to comply with them in their present form. The brokers decided to contribute a fund for the purpose of employing counsel and taking steps to secure the abrogation or the modification of the new regulations. Importers throughout the country will be asked to co-operate with them, and it is expected that a very determined effort will be made to prevent the regulations from going into effect, as at present drawn. It was said yesterday that if the Government insists upon their enforcement foreign Governments will take up the matter through their representatives in Washington.

Steel railroad ties are being extensively used in Switzerland. At present 65 per cent. of the Federal Railways employ them. They have the form or profile of a trough into which shape they are rolled at the mills. The ends are bent down, the profile of the trough being thus closed. Holes are provided for the attachment of the rails by means of clamp plates and no tie-plates are used under the rails. The weight of the trough profile is 55.47 lb. per meter and the ties complete, with holes bored, weigh 159.84 lb. each. According to the requirements of the Federal Railways the steel in these ties must have a tensile strength of about 59,000 to 64,000 lb. per sq. in. and an entire trough piece shall admit of being bent together on its back without showing any breaking fissures.

To prevent the improper use of electric current an interesting method has been devised by an Italian engineer. The practice of making especially low rates for current to be used in electric power, heating and cooking devices is becoming more and more general, but with the ordinary constant potential current it is difficult to detect the use of lighting devices on circuits intended only for power and heating purposes. This engineer, according to the Society for Electrical Development, advocates the use of special circuits on which the current is subject to extreme fluctuation of voltage at rapidly recurring intervals, which would make it practically impossible to use lamps, because of the flicker in the lights.

An Electric Drill on a Radial Machine

A new and interesting application of the Duntley electric drill which is made by the Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill., is its use for drilling comparatively small holes on a large radial drilling machine. It is frequently



Using a Portable Electric Drill on a Large Radial Drilling Machine Where a Number of Small Holes Have To Be Bored

necessary to drill small holes in large pieces of work that can only be gotten under the larger machines which require considerable power for their operation. When small holes are being drilled it is necessary to operate the machine at the maximum speed, with a resulting large amount of wear and tear.

By equipping the Duntley electric drill with a Morse taper shank, which can be fitted to the socket on the spindle of the large machine, this expenditure of power and the wear and tear on the machine have been eliminated, as it is not necessary to operate the large machine. The small motor in the electric drill is used and the feed mechanism of the radial drilling machine is, of course, employed. It is possible to apply the electric drill as quickly and easily as an ordinary twist drill can be put into the socket. Tests made on this combination in a large machine shop where the outfit is in use have shown that a marked saving in the wear and tear on the expensive radial drilling machine is secured.

A surge tank has been built for the Salmon River Power Company, at Altmar, N. Y., on the Salmon River, 50 ft. in diameter and 105 ft. in total hight. It has a straight part 80 ft. high and a bowl bottom 25 ft. deep. The total hight from the ground to the top of the roof above the tank is 205 ft. The tank acts as a governor on the pipe line to the power house, to take care of back pressure or surge when the load is suddenly taken off, or as a reservoir when the load is suddenly applied. The tank is inclosed in a wood casing to leave an air space of 1 ft. around the tank, and the air space is arranged to be heated by means of electrical coils to prevent freezing in winter. The flooring over the tank is provided with air traps to relieve air pressure when the water surges in and out of the tank. The tank was designed and erected by the Kennicott Company, Chicago Heights, Ill.

Some Catalogue Suggestions

BY G. D. CRAIN, JR.

One of the biggest leaks in the business of the average manufacturer is that which grows out of the faulty distribution of printed matter. The mailing-list seems to be made up without any discrimination, so that people receive catalogues and price-lists in which they are not even remotely interested, with the result that the expensive books are immediately thrown into the wastebasket or filed away without a chance of their ever being used. At a conservative estimate 33 1-3 per cent. of the printed matter which machinery men send out is wasted.

Not only is there a loss in the actual printing of books which are not used by the recipients, but the matter of postage is another big item. This is all the more emphasized in the case of loose-leaf publications of various kinds. The catalogue containing prices or the exclusive price-list which is worth anything must be kept up to date, and that means sending out corrected sheets to take the place of those in the binder.

The fiiling of catalogues is a job of some magnitude, and deserves a measure of attention which is often not given it. There seems to be no doubt that filing by subjects is usually more convenient, though there should be some cross reference to indicate names. It often happens that when a catalogue or price-list is filed under the name of its publisher, it is overlooked in making purchases in that line because the name of the manufacturer was not recalled.

In the same connection attention has often been called to the fact that the lack of uniformity in sizes of catalogues is a big handicap to the user. It makes it difficult to handle them and, in fact, reduces the efficiency of the book, since many who would retain it if it could be fitted conveniently into the file fail to do so because it is an odd size. Yet the tendency of the advertising expert in charge of the average catalogue is to get up "something different," and the result is that the size has usually been given little consideration, except that it must not be the usual dimensions. That is the ordinary letterhead size, and most filing cases are built to receive matter of those dimensions. Unusually small or unusually large publications are harder to handle, and, of course, this is an obstacle to their being kept and used by the buyer. [The American Society of Mechanical Engineers has made a special investigation of the importance of standard sizes of catalogues.]

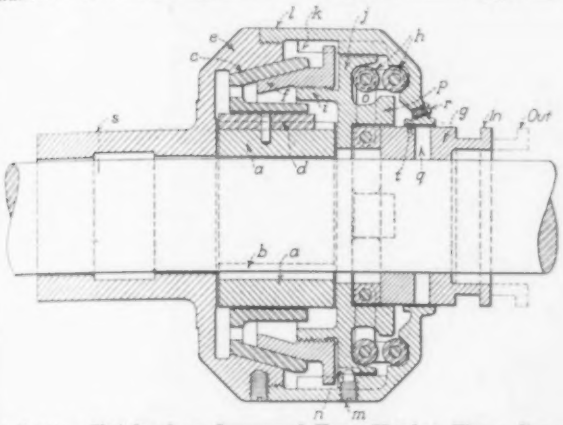
It is often possible to make a considerable saving by reducing the weight of the book through cutting down the page sizes by photo engraving processes. This is particularly true of tabulated matter. It is difficult to set up type of unusually small sizes, so that often the plan used is to set the matter in type of a conveniently large size, and then have an engraving made of a perfect proof, this being reduced to whatever size the manufacturer desires to use.

A locomotive recently hauled 21,000 tons on the Erie Railroad, the locomotive, itself weighing 410 tons, pulling a train of 250 loaded coal cars. It is reported that this record covered a haul of 40 miles at a rate of 15 miles per hour.

The business conducted by James T. Denton, dealer in machinery and equipment, 154 Chestnut avenue, Jersey City, N. J., will hereafter be known as the John Macnab Machinery Company, with no change of address.

New Type Three-Cone Friction Clutch

A new type of friction clutch designed for hard service and embodying safety-first features has been brought out by the Akron Gear & Engineering Company, Akron, Ohio. This clutch which is known as the Ideal Multicone clutch is a distinct departure from the usual type of friction clutch in that it has three cones instead of two. In this type the simplicity of the two-cone clutch is retained and a number of advantages over the two-cone type are



A Friction Clutch of an Improved Type Having Three Cones Instead of Two

claimed. The pulling power is said to be greatly increased in less space. There is smooth engagement due to momentary slippage and the clutch will release instantly. To avoid too sudden engagement of the cones their face angles are greater than those of the ordinary two-cone clutch and the clutching force and pulling power so lost is said to be more than compensated for by the addition of the third cone, which it is claimed, practically doubles the pulling power.

The cones running constantly in oil have oil films between them and these films permit a slippage before being broken down by the pressure of the cones coming into engagement. Proper face angles of the cones and the small unit pressure on the cones as well as the oil bath permit immediate disengagement when the clutch is thrown out. The third cone doubles the total area of the friction surfaces, reduces the unit pressure thereon and gives the cones longer life. The greater power capacity of the clutch in less space, makes it, it is claimed, particularly adaptable for all classes of machinery; and the small diameter and consequently light weight permit high speed and location on line-shafts. The clutch throws in with extremely small force and little movement of the shifter sleeve, making it suitable for foot control or for use where long levers are prohibited. It can be used either as a clutch or cut-off coupling.

The working parts of the clutch are completely inclosed in a cylindrical, oiltight and dustproof casing. No outside part revolves when the clutch is disengaged, if it is mounted as shown in the drawing. The adjustment is quickly made by turning the shifter sleeve and this can be done with the shaft running so that it is not necessary to shut down an entire line of machines to adjust one clutch. The horizontal pressure exerted by the throw-in mechanism is distributed equally around the complete circumference and cannot distort the cones from a true circle. The cones are in contact over their entire areas and consequently wear evenly.

When the clutch is out, the throw-in mechanism is still and centrifugal force cannot throw it in. When the clutch is in, the centrifugal force cannot throw it out, but will rather tend to keep it in. When the clutch is out and the cones separated, films of oil occupy the spaces between the cones and prevent the latter from grabbing too suddenly when the clutch is thrown in, as well as preventing them rattling when separated, thus producing, it is claimed, a quiet running clutch.

The construction and operation of the clutch is made clear in the drawing. The driving ring *a* is keyed to shaft at *b*. The middle or driving cone *c* is driven by the driving ring through two feathers *d*. Both friction surfaces of this cone contain oil grooves. The driven cones *e* and *f* are brought into contact with cone *c* when the shifter sleeve *g* is pushed in, thus throwing the rollers *h* outward and forward against adjustment ring *i*, which carries the cone *f* forward into contact with the cone *c* and the latter into contact with the cone *e*. The cones coming into contact singly prevent too sudden clutching. The cone *f* is caused to revolve with the cone *e* by the lugs *j*, projecting outward on the cone *f*, which ride between the lugs *k* on the casing *l*. The inner faces of the lugs *k* are turned true and hold the ring *i* central. The casing screws on the cone *e* and is locked by a screw. The inner end of the lock screw *m* fits into one of the numerous slots *n* in the outer circumference of the ring *i*, causing it to revolve with the casing. The adjustment of the clutch is made by inserting this screw into one of these slots. The rollers *h* and their pivot pins are large in diameter and bearing area, to insure long life and ease of operation. The links *o* straddle the lugs *k*, the ends of these lugs being raised slightly.

In throwing the clutch out the rollers *h* strike the lugs *k*, pull the cone *f* backward and give maximum clearance for oil films between the cones. The face angles of the cones are amply large for instant relief, the oil in the grooves of the driving cone aiding in this relief. The throw-in mechanism is very powerful, the ratio between the horizontal force on the shifter sleeve *g* and the pressure on each of the cone faces being approximately 100 to 1. To insure proper adjustment there is stamped on the shifter sleeve the proper force in pounds necessary on this sleeve to throw in the clutch and develop the rated horsepower.

Adjustment is made by throwing the clutch out and turning the casing so that screw *m* is above the level of the shaft. This screw is then removed and a rod is inserted in the hole *q* and the sleeve *g* is turned to the right to tighten the adjustment or to the left to loosen it. This also turns the ring *i* and the slots *n* can be seen passing under the screw hole *m*. In adjusting the clutch tighter because of wear it is seldom necessary to turn it more than one slot. After getting the adjustment so that the sleeve *g* pushes in with the correct force the screw *m* is inserted tightly in place.

To lubricate the clutch, the casing is turned so that the screw *m* is on top. Screws *m* and *r* are then removed and the casing is filled with oil through hole *m* until it runs out of hole *r*; then both screws are inserted. The bearing of the hub *s* on the shaft is lubricated by a portion of the oil which drips down the side of the cone *e* into grooves leading into the hub. Oil is prevented from dripping off the inside of the casing on the sleeve *g* by the gutter *t*, and does not escape to the outer surfaces to be thrown off by centrifugal force.

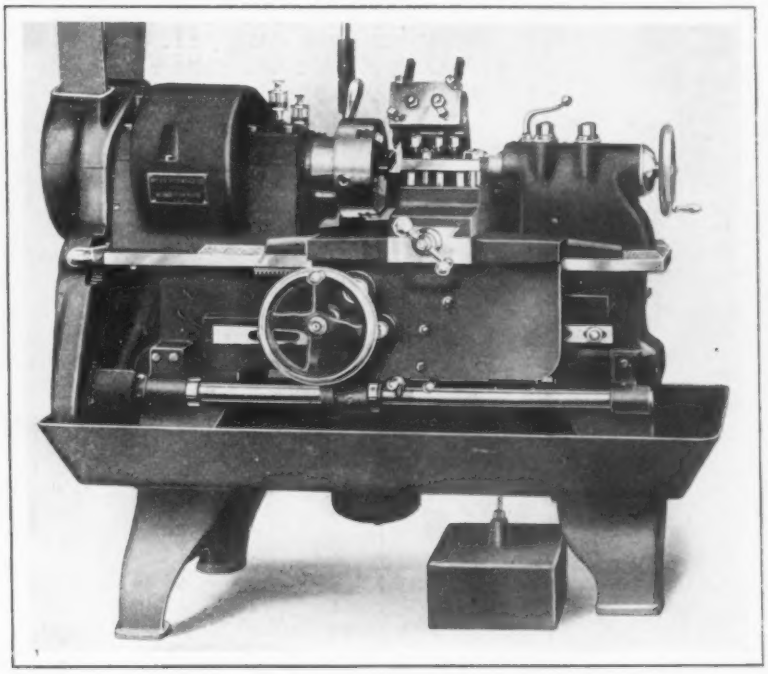
The middle or driving cone is of steel and the other two cones, the driving ring and shifter sleeve are of cast iron. The rollers, links and pins are of hardened steel.

The clutch is made in the 10 stock sizes to develop from 1 to 50 hp. at 100 r.p.m. and larger sizes are made to order.

AUTOMATIC FORGINGS LATHE

A Recent Reed-Prentice Tool for Rapid Straight Turning and Facing

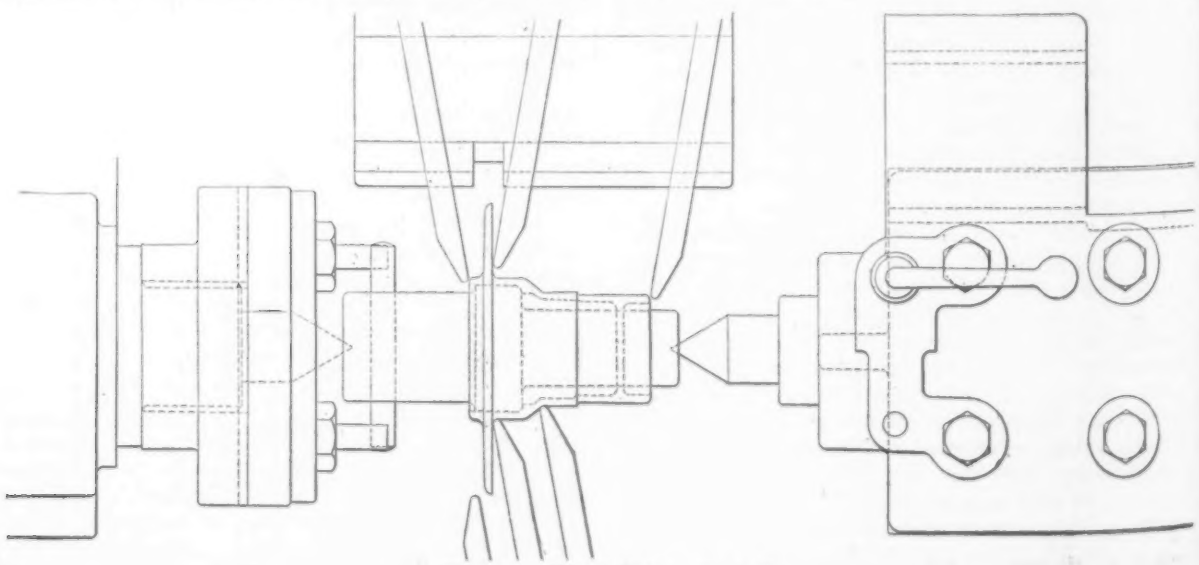
The automatic lathe shown was first designed by the Reed-Prentice Company, Worcester, Mass., specially for the Ford Motor Company, for the straight turning and facing of castings and forgings, but the machine has proved so successful that it has been established as a standard line. Its purpose is to furnish a second-operation machine which will produce a large quantity of work equal in quality to that of the best types of engine lathes. The automatic lathe embodies the one-speed and one-feed idea, which, of course, tends toward high efficiency. Change gears can be used if desired to vary the feed to suit the work, but when speed and feed are once set for a given operation they are rarely changed. It is essentially a manufacturing machine, for use where large quantities of one piece are to be produced.



A New Automatic Lathe for the Rapid Straight Turning and Facing of Castings and Forgings

Mechanically the machine is of simple design. There are two tool blocks, one carried on the cross-feed slide, the other, for the facing tools, on a back arm. The feeds of both are obtained by cams, and are actuated by the travel of the carriage. A cam feeding-in device is incorporated in the apron carriage. It consists of an adjustable bracket on the side of the bed, carrying cam surfaces which act in conjunction with a link motion to transmit the cross feed to the front tool block over the distance determined by the cam form, to procure the proper diameter. The back arm is mounted on a large shaft or bar which is supported in bearings cast integral with the head and tailstocks and bored in alignment with the main spindle. Attached to the rear of the carriage is a cam which is in contact with a roll carrier arm projecting from the shaft. Consequently the travel of the carriage gives a rotating movement to the shaft, and as the back arm is attached to the shaft the toolholder and its tools are fed to the work. When the operation is completed the feed is tripped automatically, and the carriage, impelled by the action of a heavy weight, returns to its starting position. The action of the trip is to throw the driving belt from the tight to the loose pulley of the countershaft. The same purpose can be accomplished by hand, and there is a brake operated by the lever seen at the end of the ways, at the head, which makes it possible to bring the machine to a standstill without delay.

The machine is of very heavy construction. With a 14-in. swing it is built throughout on the lines of a 20-in. heavy duty lathe, to insure entire absorption of vibration and to withstand the severest service to which it might be subjected. The weight is 3200 lb. The power is in excess of any demand that could be made. The wide double-thick belt drives to a large-diameter pulley and thence the power is transmitted to the main headstock spindle through a pair of herringbone gears, which run in oil. The headstock spindles are of chrome nickel steel, heat treated, and the bearings are hardened and run in phosphor bronze journals. Sight feed oilers are used for the lubrication of all headstock bearings. The driving pulley, which is mounted

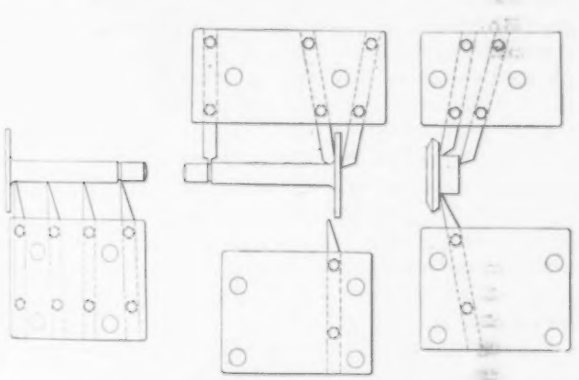


Turning a Wheel Hub in the Lathe

on a shaft at the rear of the head, thus eliminating entirely any belt tension on the main spindle, is covered by a guard which also protects all the end works gearing. The tailstock, which is of the four-bolt type, is made in one piece, instead of following the usual practice of two pieces, which insures rigidity and prevents any chance of sidewise shifting of the tailstock spindle. The carriage and apron are of equally heavy construction. The rack pinion is of hardened steel and the rack of the bed which it engages is also hardened.

To take up the cycle of operation on a piece of work, it is placed, mounted on an arbor, between the centers, the countershaft is started and the feed latch lifted into position. The feeds commence with the travel of the carriage, and the work proceeds until all diameters are turned, and all shoulders and ends faced down. The feed is then automatically tripped and the tools return to their starting position. The machine is ready for the removal of the work and to receive the next piece which has already been mounted on another arbor. One operator can thus take care of two or more machines.

In the drawings are shown the layouts of several pieces typical of the work for which the machine is adapted. All happen to be steel forgings. The wheel hub in the larger one is turned with two front tools and three facing tools, the actual time required being 2½ min. In the smaller drawing at the left is seen the first operation on a piece, the flange of which is held in a chuck while the stem, supported on a center, is turned. In the



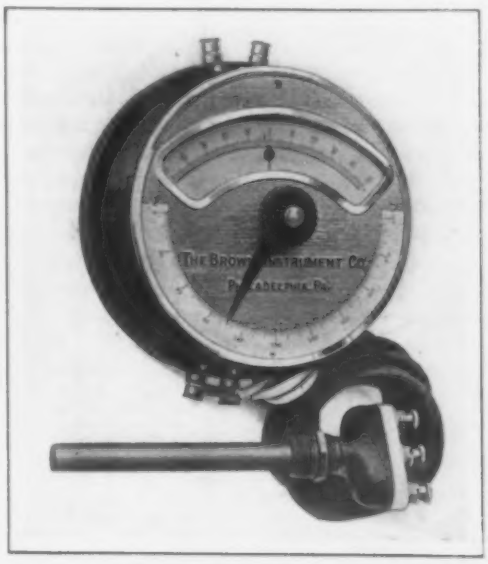
Two Typical Layouts of Work

center the second operation is being performed; the flange is turned and faced and the stem notched, in 1½ min. At the right a steel gear blank is shown being turned and faced, with three tools facing and two tools for diameter, in ½ min.

A patent (U. S. 1,100,905—June 23, 1914) has been granted to Wesley G. Nichols, Chicago Heights, Ill., for an improved method of making manganese steel, with the object of using a large percentage of manganese steel scrap without material loss of its carbon or manganese content. In substance the inventor's statement is this: Previous attempts to attain this have consisted in introducing either cold or heated manganese scrap into a bath of superheated decarbonized iron and then causing to flow over this a superheater charge of iron. The high temperature necessary in this method causes the loss of a large part of the manganese. To overcome this each of the several ingredients, such as the decarbonized iron, the ferromanganese and the manganese steel scrap, is subjected to its proper heat treatment in a separate furnace or converter and they are finally combined while molten in a common receptacle.

New Thermometer of the Resistance Type

As a substitute for the thermo-electric pyrometer in the measurement of low temperatures, the Brown Instrument Company, Philadelphia, Pa., has



A New Resistance Type Thermometer Designed for Measuring Temperatures from — 200 to 1800 Deg. F.

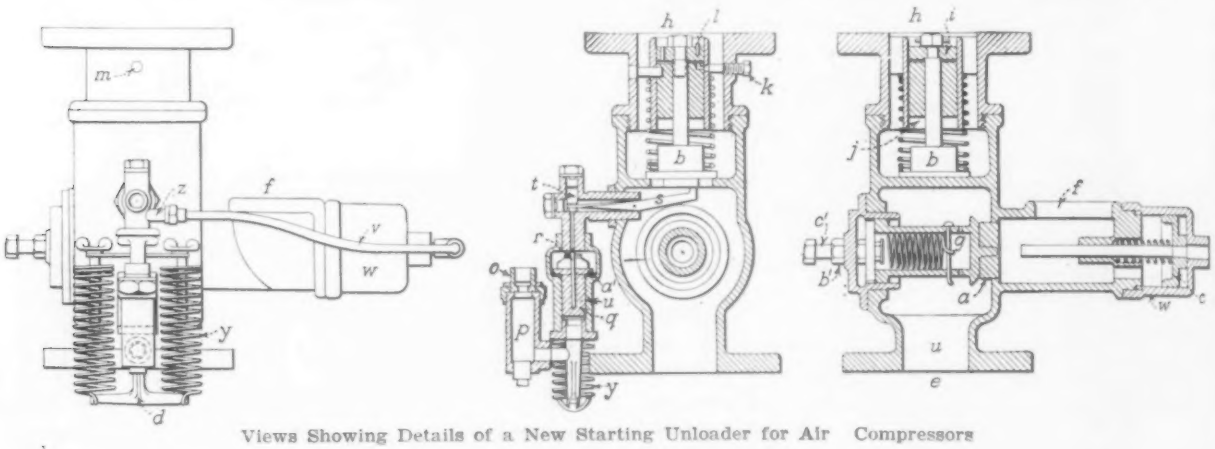
brought out an instrument of the resistance type. It is designed for measuring temperatures from 200 deg. below zero to 1800 deg. F., and can be used for measuring temperatures found in dryers and ovens, in the bearings of machines which may overheat, in the windings of motors, in transformers, on refrigerating machines and in rooms where a constant temperature must be maintained. The special advantages claimed for the instrument are the ability to read moderate temperatures from one central location without it being necessary to go from one point to another to read the temperatures as indicated on thermometers, and freedom from breakage, as the bulbs used are all of metal.

The instrument consists of a bulb or coil of resistance wire through which an electric current passes. This coil changes its resistance with changes in temperature, and there are a number of bulbs located at different points around the plant that are connected by a three-wire cable to the indicating instrument and the switchboard. This can be placed at any desired point and to determine the temperature it is only necessary to switch any one of the bulbs across the terminals of the indicating instrument. If it is desired to maintain a constant temperature the pointer can be turned to coincide with the desired graduation on the lower scale, and any movement of the pointer on the upper scale will show the increase or decrease in the temperature. Either dry cells or storage batteries, or 110 or 220 volt direct-current lighting circuits, can be used to operate the thermometer.

The National Motor & Mfg. Company, 9 East Lexington street, Baltimore, Md., has developed a new type of ceiling fan in which detachable motors are used. The motors are mounted on the fans in the customary way, but are protected by two pivoted covers which can be swung back to give access to the motor for repairs or inspection. In this way it is possible to repair the motors without taking the fans down from the ceiling, or if at any time the character of the current supplied is changed, other motors can be readily substituted. The fans, which are of the 12-in. ordinary type, consume about the same amount of current as the incandescent lamp.

Starting Unloader for Air Compressors

A starting unloader for motor-driven air compressors in which the motor current is cut out or in to stop or start the compressor when a maximum or minimum load is reached, has recently been added to the line of air controlling devices designed by George M. Richards. This device will be manufactured by the Yarnall-Waring Company, Chestnut Hill, Philadelphia, Pa., and in it the unloading action is obtained by the velocity of the air pressure passing through the chamber and the variation of the receiver pressure. The particular advantage of this unloader is that a compressor equipped with it will require very much less power to start it, and such a compressor can be driven by a motor of much less power than is ordinarily used. The unloader in no way controls the starting and stopping of the motor, it merely acting to unload the compressor and to keep it unloaded until it is again started and up to the required speed. The control of the motor current is accomplished by any of the standard types of controlling switches or circuit breakers.



Views Showing Details of a New Starting Unloader for Air Compressors

The operating parts of the unloading device are four in number and consist of a by-pass valve, *a*, a check valve, *b*, an unloading piston, *c*, and the trigger, *d*. In operation the air from the discharge port of the compressor enters through the bottom of the unloader at the point *e* and passes through the valve *a* which is open to the atmosphere at *f*, until the valve is closed by the velocity overcoming the tension of the spring *g*. The check valve *b* is then lifted and the air passes to the receiver through the port *h*. Dash pots *i* and *j* control the check valve and prevent it from seating at every stroke, the time of seating being regulated by the vent screw *k*. The small valve *l* is a vacuum breaker to allow the check valve to lift freely, and the dash pot bushing is held in place by the fixed pin *m*. Receiver pressure to operate the unloading mechanism enters the trigger cylinder *n* through the port *o* and the filter *p*. This pressure acts constantly on the piston *q* to close the bleeder valve *r*, and finally closes it when the pressure is within 3 lb. of the maximum point. As soon as the current of the motor is cut off and its speed reduced about 25 per cent., the check valve *b* seats and presses down the lever *s* and lifts the pilot valve *t*. Pressure is then admitted from the chamber *u* through the tube *v* behind the unloading piston *c* into the cylinder *w* and the by-pass valve *a* is forced open by the piston rod *x*.

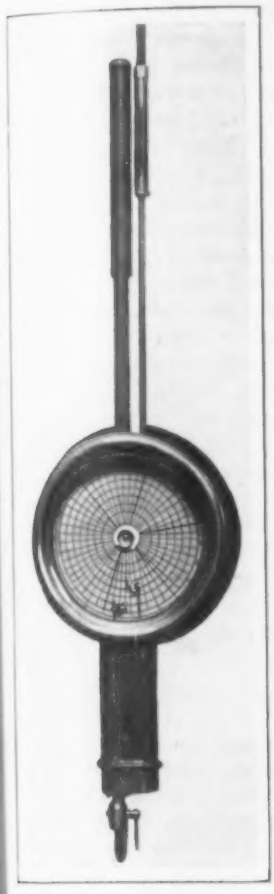
When the receiver pressure has dropped about 3 lb. or any predetermined amount, the tension springs *y* pull the trigger piston *q* and the bleeder valve *r* down. After the compressor has started again and the velocity of the air has closed the by-pass valve *a* the accumulating pressure in the valve chamber *u* blows out of the pilot valve *t* and the bleeder valve *r* until the check valve *b* lifts. This causes the lever *s* to release the pilot valve and permits it to close. The tension on the springs is usually adjusted so that the pressure under the piston *q* closes the bleeder valve *r* when within 3 lb. of the maximum pressure and opens it when the pressure has fallen off about the same amount. To prevent any possible leakage past the pilot valve *t* from acting on the unloading piston *c* and forcing the by-pass valve *a* open a very small hole is drilled at *z* for the escape of air. Just before the unloading occurs the bleeder valve *r* closes and permits the full pressure to act on the unloading piston. While loading is taking place the valve is kept open to prevent the pressure from acting on the piston. The baffle washer *a'* is relied upon to prevent the cylinder oil which may blow out of the bleeder valve from coming in contact with the piston *q*.

The unloader can be placed anywhere in the discharge line near the cylinder, although the place where it is generally located is on the discharge port of the cylinder of the air compressor. When the compressor is operating at almost the desired speed, the lock nut *b'* is backed off and the thrust screw *c'* is turned in. This moves the by-pass valve *a* toward its seat until the velocity of the escaping air closes automatically, after which the lock nut is set up. In this way it will be seen that the adjustment of the unloader to the required compressor conditions is comparatively simple. When the pressure of the air receiver is within approximately 3 lb. of the maximum, the springs *y* are adjusted so that the pressure under the piston *q* closes the bleeder valve *r* and opens the valve when the pressure has dropped the same amount. After these two single spring adjustments have been made the compressor is ready for operation under the required conditions of speed and pressure.

A reorganization has recently been effected of the Poole Engineering & Machine Company, at Woodberry, Baltimore, Md. S. Proctor Brady becomes president, succeeding Robert P. Simpson, who becomes treasurer. Other officers are German H. M. Emory, vice-president, John A. Finney, secretary; Eli Frank, H. Patterson Harris and H. R. Moyer, new directors. It is the intention of President Brady to shortly add to the facilities of the plant. Mr. Brady has been connected for some years, as vice-president with the Fidelity Warehouse Company, operating in connection with the Western Maryland railroad. In addition to machine molded gearing, pulleys and power transmission facilities, it is the purpose of the new organization to add new lines as required. Additional capital has been furnished.

Barometer and Vacuum Recorder

The Uehling Instrument Company, Passaic, N. J., has recently brought out a new type of recording instrument which combines in one the recording barometer and the vacuum gauge. These records are made on the same chart, and by using the barometer record as the base line, it is possible to read the absolute back pressure directly from the chart.



A Recently Developed Combination Recorder of Barometric Pressure and Vacuum

The device consists of two float chambers, one connected with a barometric mercury column, and the other with a mercury column in communication with the condenser. These columns and double float chambers are secured to the case of the recorder. The floats actuate the pens which move in harmony with the barometric pressure and the vacuum and trace a two-line record on the chart. It is emphasized that in this way the correct absolute back pressure, which is one of the most important factors in the economy of steam construction, is ascertained. The function of the condenser is, of course, to reduce this pressure to a minimum and the absolute back pressure of the condenser is independent of the barometric pressure. The recorded vacuum varies with the barometric pressure. The absolute back pressure is equal to the difference between the vacuum as recorded and the barometric pressure, and the nearer the former approaches the barometric pressure the lower is the back pressure and vice versa.

Shipbuilding in Great Britain

Returns of shipbuilding activity in Great Britain show that, including merchant and war ships, there are in course of construction at the present time 567 vessels, aggregating 2,314,669 tons. This is 8.8 per cent. less than at the same date last year, notwithstanding that there is an increase in the number of warships now being built. It must be noted, moreover, that many of these warships have reached an advanced state of construction, and that many of them depend altogether on the completion of the guns, armor and propelling machinery. Of merchant vessels there are 477, of 1,722,124 tons, in course of construction. When compared with a year ago, this total shows a decrease of 281,000 tons, and, when compared with fifteen months ago, when the total reached the maximum at any period in the history of shipbuilding, there is a decrease of over 331,000 tons. Thus the fall from the highest point is 16 per cent., from the figure of a year ago 14 per cent., and from the total of three months ago about 8.9 per cent.

The organization of French foundrymen, known as Association Technique de Fonderie, founded in 1910, will hold a congress at Lyon, September 10 to 15.

Multiple Spindle Chuck for the Drilling

A multiple chuck, as it may be called, designed to be attached to the main spindle of the ordinary drilling machine on the market, has been brought out by J. N. Landau, 101 W. 117th street, New York City. The chuck comprises a stationary bonnet and a member which may be rotated, the latter containing a desired number of individual drill chucks up to 10. Each of these chucks is brought into mesh with the actuating spindle of the drilling machine and automatically locked in place by a small lever, shown in the accompanying picture. A relatively small movement of the lever suffices to rotate the portion of the chuck proper containing the multiple spindles, but the chuck is designed so that only one chuck of the multiple head is in operation at any one time and then only when locked in position. Thus the only power required is that needed for the one chuck, the others remaining stationary. The lever is used to bring each chuck

A Multiple Drilling Chuck for Attachment to the Ordinary Machine

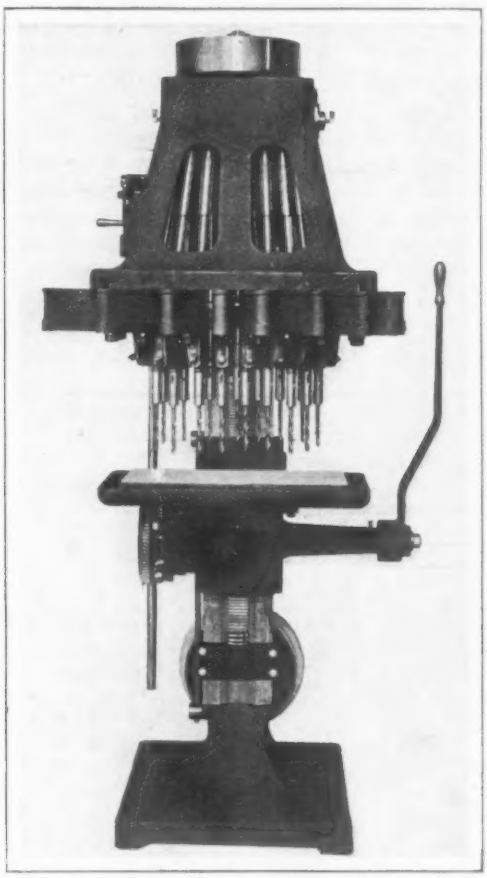
into play, throwing the preceding one out of mesh with the main driving spindle. The machine has a capacity for handling drills, reamers, counterborers and tools of a similar nature. The mechanism is inclosed, as indicated.

Making Tracings without Ink

A new drafting fabric has been put on the market by the Universal Drafting Machine Company, Cleveland, to allow making blueprints from original drawings without requiring the use of ink or pencil. The fabric is a cloth covered with a thin skin of hard brown material, and drawings are traced on it by means of a beveled steel point or scriber. Corrections may be made by means of an ordinary writing pen and ink. Lines may then be drawn through this correction. It is also easy to change a full line to a dotted line. The steel point used may be inserted into any compass when it is desired to do circular work. Blueprints made in the ordinary way give, of course, dark lines on a white ground.

New Multiple-Spindle Drilling Machine

Two new high-speed multiple-spindle drilling machines have been added to its line by the National Automatic Tool Company, Richmond, Ind. One of these, here illustrated, is designed to drill holes ranging from ½ to 5/16 in. in diameter, while



A Recently Developed Multiple-Spindle Drilling Machine for Handling a Great Variety of Work

the other is intended for driving ¾-in. drills through cast iron. The feed of each of the machines is 5 in. per min. and the maximum peripheral velocity of the drills is 75 ft. Both machines are of the same general type, the only difference being that the machine, not shown and designated by the builder as its No. 20, is of heavier construction, with larger sizes of heads and a greater number of spindles. Both machines are of the table feeding type and the head is fastened rigidly in place on the column.

The columns of both machines are of heavy box section with wide faces to which a steel rack is securely fastened. The drive is by a two-step cone pulley and a continuous belt, the cone pulleys and the idlers being mounted on Hyatt roller bearings. The top of the knee is extended to give a support where it is needed, and the main part is of box section, a construction which is relied upon to give a stiff support for the work to be drilled. Sectional weights which may be added or removed to suit the requirements of the work being drilled are employed to counterbalance the knee. The table has a large oil channel around the outer edge to catch the overflow of the lubricant and a screen oil pocket is relied upon to prevent chips from choking up the pipe.

The machine illustrated is provided with a geared feed, the box being located at the side of the column near the top. Three changes, any one of which is available while the machine is running, are provided by hardened gears running in an oil bath. All the bearings for these gears are bronze bushed. The feed worm gear of the smaller machine is made of bronze, and the worm has an extra heavy ball thrust. The worm and worm gear are entirely protected by a guard. The other machine has a new friction power feed, which, it is pointed out, possesses the advantage that the drills can be brought up against the work before the feed is engaged, thus saving time in bringing the work to the point of the drills. Any danger of breakage to the power feed mechanism is also eliminated, because the friction should slip when the pressure reaches a certain point if anything should become caught. The friction is adjusable to compensate for different loads that are being drilled. The rack pinion shaft in both machines is made of crucible steel and the pinion is cut from the solid, a construction which is relied upon to give great strength. An adjustable hand lever or a four-arm pilot is mounted at the right end of this shaft to provide for rapid advance and return of the table. The power feed, which is of worm knockout construction, can be tripped by hand or automatically at any point, the table returning to its lowest position automatically after the feed is tripped. The feed is engaged by pulling up on this lever, while pressing down upon it causes the feed to become disengaged.

The smaller size of machine is equipped with a 9 x 15 in. rectangular head, which has a capacity of from 2 to 16 adjustable spindles. The larger machine can be furnished with several sizes of heads all of which are provided with various combinations of adjustable arms or cluster boxes. Some of the heads of the larger machine are equipped with the builder's independent drill speed feature, which gives two independent changes of speed of the head for each step of the cone pulley. In this way it is possible to drill large and small holes in the same operation at the correct cutting speeds, but if only one speed of the head is desired, only one is furnished for all sizes. The larger size of head furnished will accommodate from 2 to 24 adjustable spindles. The drill spindles are made of special steel, hardened and ground, with a ball thrust at the lower end and lock nuts at the upper end to take up any wear that may develop. They are designed to take either straight or Morse taper shank drills as may be required. A reservoir to carry cutting lubricant to the point of the drills is provided. A special form of vertical adjustment is provided for the drill spindles to compensate for variations in the length of drill collets. This is secured by loosening a single nut that is always accessible. A single adjustment holds the bearing rigidly at the end of the arm, which may be moved to cover any layout within the range of the head. The universal joints used with these machines are of the builder's standard type.

The smaller machine is designed to drill eight holes ½ in. in diameter and 12 holes either ⅜ or 5-16 in. in diameter, while the larger one is intended to drill from 6 to 8 holes ¾ in. in diameter or their equivalent. The weight of the smaller machine is 1400 lb. without the adjustable arms, while that of the larger is 2300 lb.

A recently published bulletin, prepared under the supervision of C. S. Sloane, geographer of the Department of Commerce at Washington, gives estimates of the population of the United States for the years subsequent to the Thirteenth Census, which was made in 1910. Copies may be obtained from William J. Harris, director of the Census Bureau. The population of the United States in 1910, including insular possessions, was 101,748,269. The estimated population on July 1, 1914, was 109,021,992. The population of the 48 States and the District of Columbia in 1910 was 91,972,266. The estimate for July 1, 1914, is 98,781,324. The gain in four years is thus about 6,800,000.

COAST IRON AND STEEL RATES

Railroads May Get Reductions to Meet Water Competition to Pacific Points

WASHINGTON, D. C., July 29, 1914.—The Interstate Commerce Commission has fixed October 6 as the date of a hearing to be granted to representatives of the transcontinental roads at Chicago to determine the important question whether the roads may reduce existing rates to the Pacific coast on a list of commodities, headed by structural steel, wire, and other iron and steel products, to a point that will enable them to recover a large traffic which the coastwise steamship lines have long had through the operation of the long-and-short-haul clause of the interstate commerce law, as affirmed by the United States Supreme Court in the recently decided Intermountain case. The result of the hearing is of great moment to producers and shippers of iron and steel products and the impression here is very strong that the carriers will be able to make a showing that will result in an order by the Commission under which the railroads will recover a business aggregating a large tonnage per annum, while producers and shippers will be able to send their goods across the continent by rail at rates which now are available only by the much slower water transportation routes via the Isthmus of Tehuantepec.

Far-seeing observers here predict that one of the results in the agitation accompanying and following the Intermountain cases will be to give a decided impetus to the movement now on foot to bring all coastwise steamship lines under the direct supervision of the Interstate Commerce Commission, as proposed in the bill presented by Representative Alexander, of Missouri, chairman of the House Committee on the Merchant Marine and Fisheries. Such an outcome would enable the Commission to prescribe rules under which water and rail traffic could be equitably divided with reference to the facilities of the two routes, the exigencies of haste, and other factors of more or less importance.

EXCEPTIONS TO THE LONG-AND-SHORT-HAUL PRINCIPLE

Since the decision of the Intermountain case it has been conceded by the carriers that it must be affirmatively demonstrated to the Commission that sound reasons exist for making rates from Atlantic ports and other Eastern points to the Pacific coast which are less than the rates from such Eastern points to intermediate Western points; in other words, that the long-and-short-haul principle must govern except in cases where it can be demonstrated that actual water competition prevents the railroads from getting business to which they are entitled. The decision of the court further sustains the right of the Commission to prescribe zones as a basis for the fixing of rates from the East to intermediate Western points, and this right the carriers no longer deny. By October 1, therefore, the transcontinental carriers will put into force schedules complying with the recent decision of the Supreme Court and of the Commission as to 413 commodities, of which 372 are carload rates and 41 less than carloads, the new schedules to remain in force for not less than two years.

With regard to 107 items, however, the representatives of the transcontinental carriers have convinced the Commission that an opportunity should be afforded them to demonstrate the necessity of reducing existing rates from Eastern points to the Pacific coast, thus increasing the "spread" between the rates to intermediate Western points and to points on tidewater, for the purpose of meeting water competition. This opportunity will be afforded at the hearing to take place in Chicago in October and will be confined to articles where the present through rate from the Missouri River to the Pacific coast for carloads is $1 per 100 lb. or less, and for less than carloads $2 or less. Sixty-seven of the 107 items are quoted in carloads and 40 less than carloads. The business in question consists of heavy bulk traffic. The principal items of interest to readers of *The Iron Age* include structural iron, iron fences, iron posts, iron pipe, pig iron, hardware and tools, wire fencing, sectional boilers, radiators, pig and slab tin, etc.

In anticipation of the hearing to be held in Chicago in October the carriers have filed with the Interstate Commerce Commission an interesting exhibit showing the coast-to-coast shipments of all classes of merchandise by steamship lines via the Isthmus of Tehuantepec during 1913. The total runs into millions of tons and even at the low rates heretofore in force the aggregate in revenue, which the roads are now seeking to recover, is very large. Notwithstanding the fact that the railroads have maintained rates from the Missouri River to Pacific coast points on structural iron and steel and miscellaneous heavy iron and steel products ranging from 65 cents to 90 cents per 100 lb. in carloads, and from $1 to $1.60 for less than carloads, the steamship lines in 1913 secured no less than 109,500 tons of this business. On wire and wire goods the rail rates have ranged from 80 to 85 cents in carloads, and from $1.40 to $1.75 for less than carloads, but the water carriers have been able to secure over 25,000 tons of this traffic. The rail rate on sectional boilers, radiators, etc., has been maintained at $1 in carloads, substantially none of this traffic having been carried in less than carloads; nevertheless 3000 tons of this business has gone by water. The steamship lines have also secured 6500 tons of plumbers' goods on which the carload rates have ranged from $1 to $1.80 and with less than carload rates of $1.75 to $2. The railroads have made a special effort to carry tools and hardware and have made rates on the traffic of 85 cents to $1.10 in carloads, and $1.10 to $1.75 for less than carloads, but the water carriers have secured nearly 25,000 tons of this business.

At the coming hearing in Chicago the carriers will probably ask for a rate as low as 60 cents from the Missouri River to Pacific coast points on structural iron and steel and products in this general classification, while proportionate cuts will be suggested in other products. It is believed there is an excellent prospect of securing a reduction in the coast-to-coast rates.

W. L. C.

A Screw Machine with a Single-Belt Drive

The Brown & Sharpe Mfg. Company, Providence, R. I., has added to its line of screw machines a model, the notable feature of which is the single belt drive. The main driving pulley runs in one direction at a constant speed and is equipped with a friction clutch for starting and stopping, which permits of belting direct to the lineshaft, with all overhead works eliminated. Power is transmitted to the spindle from the main driving shaft, which runs through the base of the machine, by a pair of belts, one for running forward and one for driving backward, an automatic friction clutch controlling the change. A pair of gears provide for speed changes. An automatic speed change is incorporated in the driving mechanism, serving to slow down the spindle in the ratio of 1 to 2¼ for threading and similar operations. The machine handles bar stock up to ½ in. in diameter, and turns work to 1¾ in. in length.

An air-cooled blast furnace stack is the subject of a patent (U. S. 1,090,574) by John J. Shannon of Birmingham, Ala. He proposes to use air in that part of the furnace above the bosh and crucible by causing it to pass through ducts formed by pipes cast in the metal stack-plates either by natural or forced draft. The system may be connected with the stoves so that the heat absorbed by the air in cooling the stack may be conserved. By this device the air, in flowing upward through ducts, exerts its maximum cooling where most needed, tending to radiate heat into the cooler part of the stack. Objections to cooling by water are found in its large consumption, the power required to force the water to the top of the stack, the loss of heat absorbed by the water and the inability to control rapidly the cooling effect.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

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Europe's War and Business

While a general European war must still be thought improbable, the events of the past week have brought the gravest conceivable crisis short of such a war. Already the unsettlement in our own financial markets has been far more serious than was seen when the United States and Mexico were on the verge of war, while European bourses have been closed on the beginnings of wild panic. The cotton market fell at the news of Austria's declaration of war upon Servia and grain markets rose—the one movement indicating the effects of war on the industries of peace and the other the expected effort to accumulate food supplies against embargoes.

With $6,000,000,000, more or less, of foreign capital invested in this country, it need not be said that the possibilities of disturbance to business here are by no means small in case Europe should be turned into camps and battlefields. An obvious and temporarily favorable result would be the sale of American food products to Europe at good prices, the promise now being that we shall have more cereals to spare than in years. With European industries prostrated or greatly curtailed, American exports to neutral countries and to such European ports as could be kept open would mount up, and the stimulus to all home industries would be marked. The steel trade would share in such a revival of manufacture and metals would advance. Later the steel and metal-working trades of the world would be stimulated by the re-arming of the powers following the restoration of peace.

But there should be no delusion as to the value of war as a bearer of real prosperity. The war in the Balkans was called localized, yet the injury it inflicted on commerce and capital was well-nigh world-wide. The havoc a general European war would work is incalculable. The killing of hundreds of thousands of producers of wealth and the destruction of untold millions in property means nothing but material loss, whatever ultimate gain there may be to the world from conflicts resulting in moral victories. A European war would mean drain, demoralization, destruction and all the activity consequent upon it would be for the most part only the building up again of what war had destroyed. One country, like the United States, might profit for a time from the distress of others, but in the long run the heavy burdens under which the warring nations would stagger on when peace had come would be handicaps which no part of the world could wholly escape. The increase in armament throughout the world following a European war, while producing activity, would be in reality a waste of resources originating from the ground, —only the piling of fresh burdens on a tax-ridden population.

But is it really profitable to canvass the results of a general war in Europe? Such a war would signify scarcely less than the collapse of our civilization, so near an approach to chaos, in fact, as to be well-nigh unbelievable.

The Lake Ore Movement

The drastic reductions in operating forces at Lake Superior iron mines, the depressed state of the lake vessel trade and the small sales made by merchant ore firms at Cleveland, all confirm the predictions made early in the year that 1914 will be distinctly an off year in iron ore. The shipments to July 1 were 9,624,000 tons, or less than 60 per cent. of the movement to the corresponding date last year, which was 16,125,000 tons. The same percentage carried out to the end of the season would give a movement of 30,000,000 tons, as against practically 50,000,000 tons in 1913.

There are few precedents for such a reversal of form in a single year. The most conspicuous are the decline from 43,442,000 tons in 1910 to a 75 per cent. movement, or 32,793,000 tons in 1908, and the sheer drop from 42,266,000 tons in 1907 to 26,014,000 tons in the lean year following, a falling off of 39 per cent. Such fluctuations show how iron ore can be a highly speculative factor in the iron trade, even though it has not approached pig iron in the extent of ascent or decline in price in a single twelve-month.

It was in hope that the situation in finished products—those of the foundry as well as of steel works and rolling mills—might develop sufficiently to indicate the course of business throughout the year, that the announcement of ore prices was delayed until late April this year. But a month of the second half of the year has now passed without any assurance as to the amount of increase in output that may be reasonably looked for in the next four or five months. There is agreement among the steel companies in reporting some gain in orders in the past two months, but the industry is not yet at the point of seeing any marked broadening of confidence, such as brings free buying. It

is a question, therefore, whether those in the ore trade who have been on the alert for sign boards have found in the developments of the past two months anything that will change their programme in the two months that are ahead. So far as the merchant furnaces are concerned both the volume of their business and the miserable returns from it have made them willing to run the risks of an ore shortage in the early months of 1915, rather than take on a ton of ore more than they now seem likely to need before 1915 cargoes begin to come down.

It is a situation in which the swing on the low side of the line of 10-year average ore shipments may even exceed the upswing to the 50,000,000-ton record in 1913. It is to be remembered, however, that in only seven out of the last 25 years was there a decline in Lake ore shipments. These years were 1891, 1893, 1896, 1903, 1904, 1908 and 1911. It is to be considered also that merchant ore is a relatively small percentage of the total (though it may be an increasing percentage in the next few years) and that the distress of the merchant blast furnaces, which largely reflects conditions in the foundry trade, does not accurately measure the ore requirements of the self-contained steel companies. The Steel Corporation in particular has always carried a liberal reserve of ore in its furnace yards as a protection against lake and dock strikes. It may turn out, therefore, that for reasons not found in the pig-iron market the ore movement of this year will show less of a falling off from 1913 than the memorable drop of 39 per cent. in 1908.

Measures of Trade Activity

There are some who fear that the saying variously attributed to two financiers, "The man who is a bear on the future of this country will go broke," may not always hold good. Perhaps they recall that J. P. Morgan, one of the two, was credited with saying in 1903, "This is a new era and statistics don't count," and that the saying did not prove altogether a happy one.

It becomes desirable to seek for measures of trade activity as suggesting whether the country has lately been growing as formerly, or is likely to grow at an equal pace in the future. A few such measures may be collated.

Production of coal in the United States in 1913 is reported by the Geological Survey at 570,048,125 net tons, a gain of 7 per cent. over the previous year, which had been the record year. From 1905, a very good year, to 1913, the average gain, one year over the preceding, was 4.8 per cent., while from 1895 to 1905 the average annual gain was 7.4 per cent. The 1913 tonnage was more than double that of 1900. All such gains are very large, for the average annual increase in population is only a trifle over 2 per cent. The production of coal is naturally a very close measure of industrial activity, and the recent gains are really more significant than the gains in the latter part of the 19th century, because at that time a large part of the increase in coal consumption was due to the decrease in wood consumption, a factor which of late has been practically eliminated.

The production of cement (almost exclusively Portland) has been increasing at a rapid rate, successive gains over the preceding year having been: 1911, 2.4 per cent.; 1912, 4.8 per cent.; 1913, 11.3 per cent.

A particularly authoritative index to trade activity is the total ton-mileage of the railroads. This has been as follows in selected fiscal years, in millions of ton-miles:

1885.....	49,152	1910.....	255,017
1890.....	79,193	1911.....	253,784
1895.....	88,568	1912.....	263,780
1900.....	141,162	1913.....	301,399
1905.....	186,463		

Both 1912 and 1913, it will be observed, made new records, and 1913 made a new record by a wide margin. From 1885 to 1895 the average annual increase was 6.1 per cent.; during the next ten years the average gain was 7.7 per cent.; while in the past eight years the annual average gain was 6.2 per cent., making a very good showing for recent years, especially considering the relatively slow rate of increase in population.

In none of these statistical illustrations is there any clear indication that the country has less tendency to grow now than it had a few years or a few decades ago. The common view is that the country has not been expanding since 1907 at anything like its previous rate, and there are even those who maintain that we have actually been passing through seven years of hard times since 1907. Were this true, by the way, the seven years will be up next October. If under the relatively adverse conditions which are generally recognized the country grows as it has in such important items of production as coal and cement, and in the vital matter of freight moved, there is certainly an augury for still more rapid expansion in future, when nearly all authorities hold financial and industrial conditions will be better.

In the iron trade proper, the old rule of tonnage doubling each decade is generally regarded as having broken down, and yet that is not proved altogether as conclusively as might be desired. The pig iron production of last year was 72 per cent. greater than the production in 1903, itself a record year. Steel, however, is now regarded as a better index than pig iron, and last year's production of steel ingots and castings was no less than 116 per cent. in excess of that of 1903. It has always been perfectly obvious that the rate of increase in iron and steel production could not continue indefinitely and in the circumstances the increases in recent years should be regarded as altogether satisfactory. The time has not yet arrived for anyone to be a bear on the growth of the country.

Machine Tool Prices

Prices of machine tools have been maintained quite consistently during the depression. Concessions have been made in some cases, but considering all the circumstances the manufacturers' lists have been adhered to quite closely. The lesson is being learned in this branch of industry that price reductions have little effect in stimulating demand. The builder or dealer who offers a sacrifice in the attempt to secure business may occasionally profit

by it for the moment, but in the long run he is a loser if the practice becomes at all general as between himself and his competitors. Were conditions in the trade like those of not many years ago the lists would have been shot to pieces by now. The revival will see prices start nearly where they were when the market fell away.

It is noteworthy that several new machines brought out since the demand became dull have been listed at prices which are an actual advance. This is especially true of high-priced tools. The manufacturers are realizing more and more that price cuts little figure in buying a machine which will reduce cost of production in a material way. The buyer is looking for a maximum of economy and he wants the best that can be had. Probably his attention is most strongly attracted at first to the machine that costs the most. He does not look first at the cheapest and work upward. Generally speaking, that which costs the most money has the greatest advantages. The average manufacturer who is to add expensive equipment takes a very active personal interest in the transaction and he usually chooses the machine which he believes will do the work required of it at the least cost.

While the tariff has had hardly a fair chance to develop its influence on the machine tool situation, owing to the dull times, enough has come up to indicate that foreign machinery will not, at least for some time to come, make any serious invasion of the American market, certainly not to the point of affecting prices. The demand for American machinery abroad has revived materially in the last year, which proves that many European users prefer the American models to those of their own builders, even though the cost of the American machines is a good deal higher. To be sure, the American tools which are selling abroad are of the highest class and many of them are designed for special purposes. Our cheaper tools are not going to Europe and it is the foreign competition in such tools that is most feared. But it will take years before American users can be persuaded that the average machine tool built abroad is as good as the home product. This is wholly natural. Men get used to a certain standard as applied to a given class of product and it is hard to persuade them to accept a substitute.

The Electric Metals Corporation, with offices at Indianapolis, Ind., has been incorporated for $10,000 in Arizona. It controls the Buckman furnace patents for the electric smelting of non-ferrous ores. H. H. Buckman is president; I. A. Pritchard, vice-president, and J. M. Ryan, general manager. The Buckman Electric Iron & Steel Furnace Company, with offices at Indianapolis, Ind., has also been incorporated in Arizona for $10,000. The company manufactures electric furnaces for smelting iron ore and refining iron and steel. H. H. Buckman is president and J. M. Ryan, vice-president and general manager.

Johnson Electric Smelting, Inc., New York, is now completing arrangements for the erection at Keokuk, Iowa, or across the river at Hamilton, Ill., of a demonstration plant to establish the commercial value of the Johnson process for the treatment of lead and copper ores with so high a content of zinc as to prevent profitable reduction by present lead or copper smelting operation. An electric furnace with a capacity of 10 tons a day will be built at the start. Later the plant may be expanded to a series of large size furnaces running up to 100 tons, or possibly to 200 tons.

SCOPE OF MAKER'S WARRANTY

Dealer's Liability on Articles Warranted by Manufacturer

The rule of law that a dealer in machinery is not liable on a warranty attached thereto by the manufacturer, unless the dealer has expressly adopted the warranty as his own, is sustained by an interesting decision of the Minnesota Supreme Court. Plaintiff, a blacksmith, bought an emery wheel from defendants, wholesale and retail dealers in hardware. A card placed upon the face of the wheel by the manufacturer contained language from which it could be reasonably inferred that it was warranted that the wheel could be safely operated at a rate of 1800 r. p. m. While plaintiff was using the wheel in sharpening a tool, it broke and injured him, and he sued for damages on the ground that the injury resulted from a defect warranted against. He claimed that although the card was placed upon the wheel by the manufacturers, defendants adopted it as their own by making the sale without removing it therefrom. But the Minnesota Supreme Court refused to adopt this contention and held that defendants were not liable on the warranty, saying:

MINNESOTA COURT RULING

"Conceding that the printed matter upon the face of the wheel was sufficient to constitute a warranty, we are unable to concur in the contention that it was the warranty of the defendants. A warranty consists in representations and statements of, and concerning the condition and quality of personal property, the subject of sale, made by the person making the sale, to induce and bring it about. So far as the evidence in the case at bar shows, nothing whatever was said between the plaintiff and defendants concerning the condition or quality of this wheel, whether it was capable of making 1800 r. p. m., or any other number of revolutions, or whether it was fit and suitable for any particular purpose. Attention was not called by either party to the alleged printed warranty, and, for aught that appears from the record, the same was not noticed by either at the time of the sale. Clearly, under such circumstances, the placard cannot be held to be the warranty of defendants, and to hold that they adopted the representations purporting to be thus made would be going far beyond any case to which our attention has been called.

"Whether the manufacturers would be liable to plaintiff upon this warranty, either upon the ground of neglect in the manufacture of the wheel or for a breach of warranty, is wholly irrelevant to the question. If it be granted that the manufacturers would be liable, it by no means follows that defendants are. We are clear that the mere sale of the wheel by defendants with the printed matter pasted thereon, without other act or ceremony, did not amount to an express warranty on their part. . . . Neither can plaintiff recover upon the theory of an implied warranty. It may be, and doubtless is, true that there is an implied warranty in all cases where an article is manufactured and sold for a specific purpose that such article is fit and suitable for the purposes intended for it. But that rule can have no application to the case at bar, for plaintiff relies in his complaint, not upon an implied, but upon an express warranty; and besides, defendants were not the manufacturers of the wheel."

STEEL CORPORATION EARNINGS

Deficit for June Quarter, $5,159,237, Against $6,289,644 Deficit in Previous Quarter

The United States Steel Corporation's statement for the quarter ended June 30, issued on Tuesday, shows net earnings of $20,457,596, against $41,219,813 for the second quarter of 1913. The falling off is thus more than 50 per cent., but there is an increase of $2,463,000 over the earnings for the first quarter of this year, which were $17,994,381. The statement is as follows, with comparison with the second quarter of 1913:

	1914	1913
April	$6,920,879	$13,072,710
May	6,845,823	14,554,566
June	6,690,894	13,592,537
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants and interest on bonds of the subsidiary companies	$20,457,596	$41,219,813
Less charges and allowances for depreciation:		
Sinking funds on bonds of subsidiary companies and depreciation and extraordinary replacement funds	5,613,007	7,629,786
Sinking funds on U. S. Steel Corporation bonds	1,546,961	1,669,416
Net income	$13,297,628	$31,920,611
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding	5,571,142	5,642,546
Premium payable on bonds redeemable under sinking funds	227,023	.....
Balance	$7,499,463	$26,278,065
Deduct dividends for the quarter on stocks of the United States Steel Corporation:		
Preferred	6,304,919	6,304,919
Common	6,353,781	6,353,781
Deficit for the quarter	$5,159,237	.....
Surplus for the quarter	.....	$13,619,365

The regular dividends of 1¾ per cent. on the preferred and 1¼ per cent. on the common stock were declared. The deficit on the December, 1913, quarter was $1,002,304, so that the dividends on the common stock declared for the past three quarters have taken a total of $12,451,185 from surplus.

Revised Drawback Allowances on Steel for Hack Saws

WASHINGTON, D. C., July 29, 1914.—The Treasury Department has prepared a series of revised regulations for the allowance of drawback of duty paid on steel blanks imported for the manufacture of hack-saw blades intended for exportation. The department makes two important concessions to manufacturers in the new regulations, including wastage allowance and an alternative method of identifying the imported steel in the exported saws. The regulations are in part as follows:

"The department's regulations of August 21, 1913 (T. D. 33,705), providing for the payment of drawback on hack-saw blades manufactured from imported steel, are hereby amended to provide for an allowance to compensate for waste in milling and punching the hack-saw blanks.

"The sworn schedule of the manufacturer shall show the commercial designation (dimensions) of the saws of each size manufactured for exportation with benefit of draw-back and the dimensions of the blanks used in the manufacture thereof. Original sworn schedules filed under these regulations shall be forwarded to the special agent for investigation and report. Supplemental sworn schedules shall be accompanied by a sworn sample of each size of hack-saw blade covered thereby and of the hack-saw blanks used in the manufacture thereof and such supplemental sworn schedules, with the samples, shall be forwarded to the special agent for verification in such manner as he may deem proper.

"At the election of the manufacturer the imported steel used in the manufacture of exported hack-saw blades may be identified against the several import lots of steel used during a manufacturing period of three or six months, as the manufacturer shall prefer. In such case an abstract from the manufacturing record shall be filed with the collector of customs, which will show the usual import data covering the several lots of imported steel used during the period covered thereby, the value of such steel laid down at the factory, and the value of the waste during such period. In such case the drawback entries shall be liquidated on the basis of the lowest rate of duty paid on any of the steel used during the period in which the hack-saw blades covered thereby were produced.

"The allowance shall not exceed the weight of the hack-saw blanks used in the manufacture of the exported hack-saw blades, such allowance to be reduced according to the quantity of imported sheet steel which the value of the waste, predicated on 7½ per cent., of the weight of the hack-saw blanks used, will replace."

For the information and guidance of the collectors of customs in the liquidation of entries under the amended regulations, the department has prepared a schedule showing the standard weight of sheet steel per square foot by gauge. This schedule is practically identical with that to be found in standard engineering manuals and ranges from 14.3616 oz. for No. 22 gauge metal up to 42.4320 oz. for No. 65 gauge. W. L. C.

The Republic Iron & Steel Company will blow in its No. 2 Haselton furnace at Youngstown, Ohio, this week in view of the increased rate of operations at its steel works. One of the company's three Pioneer furnaces at Thomas, Ala., has been out of blast for repairs and relining in the past few months. It may go in in the next few weeks.

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The Iron and Metal Markets

WAR NOT YET A FACTOR

Some Effects Seen in Export Trade

July Has Brought a Measurable Improvement in Volume of Orders

European war news has not yet been a measurable factor in the domestic steel trade. In exports the influence of war risks is felt, and with increasing grain engagements at advancing rates there has been a tightening of the general ocean freight market. Galvanized sheets, of which Austria and Germany are considerable producers, while England is a heavy exporter, are up 10 shillings a ton in European markets. There has also been a stiffening in tin plate abroad.

The steel trade has so long gone without business produced by the investment of capital in new enterprises that there is little in that direction that war can interrupt. Whatever the railroads may have planned in extensions and equipment, contingent on getting most of the rate advance they asked, will naturally be harder to finance under present conditions.

The effect of the advances in three leading products to 1.15c., Pittsburgh, has been chiefly seen in the increase of specifications on 1.10c. contracts previously made. More indications appear that a fair amount of business was taken by several interests on the 1.10c. basis before the advances were announced. In some cases deliveries on such contracts were limited to the third quarter and specifications were required by one or two sellers before August 1.

Generally July has brought a slight improvement in the situation in finished steel. A number of independent manufacturers report specifications almost equal to capacity. One such interest has taken new orders in July thus far equivalent to one-third more than capacity. The Steel Corporation's unfilled orders at the end of the month are expected to show a somewhat greater increase than that for June.

Miscellaneous railroad buying is rather better. Frog and crossing works have taken 8000 tons of rails from one interest and the Northern Pacific has bought 8000 tons of tie plates. There are two new freight car orders—1000 for the Toledo & Ohio Central and 500 for the Chicago Great Western. The C. H. & D. is in the market for 2000.

The structural movement is again of some note. The American Bridge Company has the contract for the bridge at Metropolis, Ill., and Paducah, Ky., 18,000 tons. At Sciotoville, Ohio, the proposed C. & O. bridge, 16,000 tons or more, has become an active project, only awaiting Government sanction, and the Kansas City terminal, 17,000 tons, is practically awarded. In New York City contracts of the week amounted to 13,000 tons, besides a new 3500-ton subway award. The Philadelphia Electric Company power house, 5000 tons, was placed with a New York firm.

Bars continue to be the best dependence of the mills, and all have good specifications for August rolling. In plates the new price is more elastic, as indicated in some Eastern competition.

Late buying of sheets by automobile builders amounted to more than has been reported, one producer having booked 50,000 tons of high-grade sheets for such work. Some recent sheet contracts run to April, 1915, and with such backlogs producers have been trying to get better prices.

The Standard Oil Company has divided a tin plate order for the Far East between Welsh and American mills and the Texas Company has just placed 100,000 boxes.

Southern pig iron sales in July have been large, probably 175,000 tons, much of this, where deliveries extend late into the year, going at $10.25 for No. 2; while $10 has been a common price for third quarter iron. In Northern iron the competition of Central Western furnaces having their own ore is more marked in territory usually supplied from other districts.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	July 29, 1914.	July 22, 1914.	June 24, 1914.	July 30, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.75	$14.75	$14.75	$15.50
No. 2, Valley furnace...	13.00	13.00	13.00	13.75
No. 2 Southern, Cin'ti...	13.25	13.25	13.50	13.75
No. 2, Birmingham, Ala.	10.00	10.00	10.25	10.50
No. 2, furnace, Chicago*	13.75	13.75	13.75	14.75
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.00
Basic, Valley furnace....	13.00	13.00	13.00	14.25
Bessemer, Pittsburgh....	14.90	14.90	14.90	16.40
Malleable Bess., Ch'go*..	14.00	14.00	14.00	14.75
Gray forge, Pittsburgh..	13.65	13.65	13.65	14.40
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh.	19.00	19.00	19.00	27.00
O.-h. billets, Pittsburgh.	19.00	19.00	19.00	27.00
O.-h. sheet bars, P'gh...	19.50	19.50	20.00	27.50
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila.....	21.90	21.90	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	24.50	28.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	12.00	12.00	12.75	14.00
Iron rails, Philadelphia..	14.00	14.00	15.00	17.50
Carwheels, Chicago.....	11.25	11.25	11.50	12.75
Carwheels, Philadelphia..	11.00	11.00	11.00	12.00
Heavy steel scrap, P'gh..	11.50	11.50	11.50	12.25
Heavy steel scrap, Phila.	*10.00*	10.25	10.50	11.25
Heavy steel scrap, Ch'go	9.75	9.75	9.75	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.75	10.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17½	1.17½	1.17½	1.42½
Iron bars, Pittsburgh....	*1.15*	1.25	1.25	1.65
Iron bars, Chicago.....	1.05	1.05	1.05	1.50
Steel bars, Pittsburgh...	1.15	1.15	1.10	1.40
Steel bars, New York....	**1.31**	1.26	1.26	1.56
Tank plates, Pittsburgh.	1.10	1.10	1.10	1.45
Tank plates, New York..	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh.	1.15	1.15	1.10	1.45
Beams, etc., New York..	1.26	1.26	1.26	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.50
Steel hoops, Pittsburgh..	1.20	1.20	1.25	1.60
Sheets, Nails and Wire				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.75	3.30
Wire nails, Pittsburgh...	1.55	1.55	1.50	1.70
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.65
Fence wire, base, P'gh..	1.35	1.35	1.30	1.55
Barb wire, galv., P'gh...	1.95	1.95	1.90	2.20

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

Per Net Ton at Oven:	July 29, 1914.	July 22, 1914.	June 24, 1914.	July 30, 1913.
Furnace coke, prompt...	$1.75	$1.75	$1.75	$2.50
Furnace coke, future....	1.85	1.85	1.85	2.50
Foundry coke, prompt...	2.25	2.25	2.30	2.75
Foundry coke, future....	2.35	2.35	2.50	3.00

Metals.

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	*13.37½*	13.75	14.12½	15.25
Electrolytic copper, N. Y.	*13.00*	13.50	13.75	15.00
Spelter, St. Louis.....	**4.95**	4.85	4.90	5.45
Spelter, New York.....	**5.10**	5.00	5.05	5.60
Lead, St. Louis.....	3.75	3.75	3.80	4.35
Lead, New York.....	3.90	3.90	3.90	4.50
Tin, New York.....	*30.87½*	31.60	30.75	40.25
Antimony, Hallett's, N. Y.	6.75	6.75	6.75	7.75
Tin plate, 100-lb. box, P'gh	$3.25	$3.25	$3.30	$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c. St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10...	.30
Gauges under No. 10 to and including No. 12...	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles.	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft., inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.35; galvanized, $1.75. Galvanized barb wire and fence staples to jobbers, $1.95; painted, $1.55. Wire nails to jobbers, $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open- hearth and chain rods, $24.50 to $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ to 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ to 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., July 28, 1914.

Developments have not been particularly encouraging. There is a fair volume of new business in finished iron and steel, but it is probable that most consumers have already placed contracts for their needs over the third quarter. Most of these are on the basis of 1.10c. for steel bars, plates and shapes, and the recent advance of $1 a ton on these products is no doubt stimulating specifications. The large steel mills state that on new orders they are quoting 1.15c. on plates, shapes and bars, but not much business has yet been closed at this price. Sheets are in fair demand and specifications against contracts are moderate, but tin plate specifications are dull and prices are unsteady, due to the persistent efforts of two or three mills to find a market for their product. Wire products are moving freely on old contracts made at $1.50 for wire nails and $1.30 for plain annealed wire; little business has come in at the advanced prices, $1 per ton higher. Pig iron, steel billets and sheet bars are dull in new demand and coke has gone off in price. Scrap is dull and prices are weak.

Pig Iron.—New inquiry comprises only small lots of foundry and basic iron, running from 100 to 300 tons. Furnace companies are not trying to make sales, and the market is holding fairly steady. A sale of 600 tons of Valley No. 2 foundry iron is reported at about $13, Valley furnace. No. 1 blast furnace of the Shenango Furnace Company, Sharpsville, Pa., has been completely rebuilt and will be ready for blast about August 15. It is a 500-ton furnace and is practically a duplicate of the last stack built by the Youngstown Sheet & Tube Company. The Shenango Furnace Company, of which W. P. Snyder is president, now controls the output of five furnaces, three at Sharpsville, one at Struthers, Ohio, and Mary furnace of the Ohio Iron & Steel Company, Lowellville, Ohio. In the practical absence of sales we repeat former prices on pig iron as follows: Bessemer, $14; basic, $13; malleable, $13; No. 2 foundry, $12.90 to $13, and gray forge, $12.75, all at Valley furnace, with 90c. a ton freight rate for Pittsburgh or Cleveland delivery.

Billets and Sheet Bars.—The rate of operations among sheet and tin plate mills is still light, running from 50 to 70 per cent. of capacity, and this is reflected in specifications against contracts for sheet bars, which are only fair. There is no new buying, as consumers are covered ahead and have been getting billets and sheet bars faster than needed. We quote Bessemer and open-hearth billets at $19 to $19.50, and Bessemer and open-hearth sheet bars at $19.50 to $20, f.o.b. maker's mill, Pittsburgh or Youngstown. We quote forging billets at $25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging billets are held at $26. We quote axle billets at $23 for desirable orders and $24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—The local market is very dull, consumers being covered ahead on ferromanganese and ferrosilicon for the remainder of this year. An occasional carload of English ferromanganese is sold at about $37.50, Baltimore, but German is offered at $37, Baltimore, the freight to the Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent., spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—The local market on the best grades rolled from all pig iron is about $27, delivered to buyer's mills in the Pittsburgh district.

Structural Material.—New inquiry is fairly active, but jobs placed in the past week have been light. The American Bridge Company has taken 1500 tons for a bridge for the Erie; the McClintic-Marshall Company, 1000 tons for the Sea Beach elevated line, Brooklyn; the Jones & Laughlin Steel Company, 600 tons for an addition to the plant of the Phillips Insulated Wire Company, and the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, 400 tons for the Baltimore & Ohio. Local mills and fabricators are watching developments in connection with bridges, one at Metropolis and the other at Kansas City, each calling for about 17,000 tons, and a 15,000-ton bridge across the Ohio River at Sciotoville, Ohio. It seems certain now that these three bridges will be built, and in that case Pittsburgh mills will probably supply most of the steel. We quote beams and channels up to 15-in. at 1.15c., f.o.b. Pittsburgh.

Plates.—New car orders in the past week have been light. The Standard Steel Car Company has taken 200 steel gondolas for the Erie Railroad, and this road is still in the market for 600 cars of the same type. The Lackawanna has placed 110 passenger cars, the Southern Pacific 40 passenger cars and other roads about 40 passenger cars with the Pullman company. The Wabash has placed seven postal cars with the Standard Steel Car Company. It is stated the new price of 1.15c. on plates is being asked by the mills on new inquiries, but some options are still out at 1.10c. We quote ¼-in. and heavier tank plates at 1.10c. to 1.15c., f.o.b. Pitttsburgh.

Steel Rails.—The Carnegie Steel Company has received an order for 1000 tons of standard sections for the Toledo, St. Louis & Western and the Pennsylvania Lines West are reported in the market for 20,000 pairs of splice bars. The Cambria Steel Company has taken 4000 tons of rails for the Southern. New demand for light rails is quiet. We quote light rails rolled from billets as follows: 25, 30, 35, 49 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—No large orders have recently been placed, but prices are firm. We quote 33-in. engine truck forged steel wheels at $22 to $24; 36-in., $23 to $25; 33-in. tender wheels, $18 to $18.50; 36-in. passenger train car and tender wheels, $20 to $20.50, and 33-in. freight car wheels at $15.50 to $16, all f.o.b. Pittsburgh.

Skelp.—It is stated that two local mills are figuring on 15,000 tons of grooved steel skelp for foreign delivery. New business is light, as none of the pipe mills is running full time, and most of them make all the skelp they need. Prices are only fairly strong, as in one or two recent sales grooved steel skelp is said to have sold as low as 1.10c. We quote: Grooved steel skelp, 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—New inquiry is light, and specifications against contracts only fair. The recent advance of $1 a ton on wire products has added a little strength to the rod market, but prices are not as yet higher. We continue to quote Bessemer, open-hearth and chain rods at $24.50 to $25, f.o.b. maker's mill, Pittsburgh, but on new inquiries it is probable $25 would be the minimum quotation.

Iron and Steel Bars.—Local steel bar mills are believed to have more actual business on their books for third quarter and last half of the year than is generally apprehended. Buying by the implement makers and wagon builders in June and early July was quite heavy. It is stated that on all new inquiries the leading steel bar mills are quoting 1.15c., but some old options are

out, which expire on July 31. The bulk of the third-quarter business is at 1.10c., some of it at 1.15c., while for last half 1.15c., and in some cases, 1.20c., is reported to have been done. The market on common iron bars is dull and some low prices are being made. We quote common iron bars, made from scrap and muck bar, at 1.15c. to 1.20c., f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over, $1; ½ to 11/16-in., $1.50; under ½-in., $2.50 per net ton. These extras are not always observed.

Hoops and Bands.—There has been some small buying of steel bands at the new price of 1.15c., but most consumers were covered for the third quarter at 1.10c. and specifications against these contracts are only fair. New demand for hoops is dull, but the large cooperage shops usually start to specify in September, and better business in hoops is looked for before long. We quote steel bands at 1.15c. on new orders, extras as per the steel bar card, and steel hoops at 1.20c. to 1.25c., the lower price being on desirable orders for prompt shipment.

Cotton Ties.—The Carnegie Steel Company has about completed rolling its quota of 1,500,000 bundles of steel cotton ties for this year's trade, and prices remain unchanged at 65c. per bundle of 45 lb.

Sheets.—There has been considerable activity in the sheet trade of late, automobile builders and implement makers having placed some large contracts which run up to April, next year. One leading interest has taken upwards of 50,000 tons of high grade automobile sheets, and other makers have also booked heavily. It is understood that prices obtained on these contracts range from $2 to $4 a ton higher than are quoted for prompt delivery. The new demand for black and galvanized sheets is fair, but specifications against contracts are only moderate. This week the American Sheet & Tin Plate Company is operating to 70 per cent. of capacity, but runs only four days a week, closing down on Friday and Saturday. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—There is no new buying of tin plate, and specifications from the large can makers are not satisfactory. The months of June, July and August are usually the most active in specifications from the can makers, but this year has proved an exception. The crop of early June peas was light, and the amount of peas canned this year will be smaller than usual. None of the tin plate mills is running full, the average rate of operations being possibly 70 per cent. The American Sheet & Tin Plate Company is operating four days a week at about 90 per cent. of capacity, closing down on Friday and Saturday of each week. There have been some disturbances in prices by three or four recently built mills which offered tin plate to consumers, who had already contracted, at prices somewhat lower than named in the contracts. In other words, tin plate mills that started after contracts had been made last year have been compelled to make low prices to get business. We quote 100-lb. 14 x 20 coke plates at $3.25 to $3.35, and 100-lb. 14 x 20 terne plates at $3.15 to $3.25, f.o.b. Pittsburgh.

Shafting.—The new demand for shafting is fair, and large consumers such as the automobile builders and implement makers, whose contracts expired on July 1, have made new contracts for their supply of shafting for third quarter and in some cases for last half of the year. Specifications against contracts are reported coming in at a good rate. We quote cold-rolled shafting at 66 to 67 per cent. off in carload lots, but on some very desirable business for prompt shipment, 68 per cent. has been named. Small lots are quoted at 64 to 65 per cent. off, delivered in base territory.

Spikes.—New buying by the railroads has been more active recently, some Western roads having placed contracts for quantities ranging from 1000 to 5000 kegs. As a rule railroads want spikes shipped out promptly when ordered, showing they are buying for needs. We quote standard sizes of railroad and boat spikes at $1.35 to $1.40 and small railroad and boat spikes at $1.45 to $1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh. It is stated that some makers on new orders are holding standard sizes of railroad spikes at $1.40 minimum.

Merchant Steel.—A fair amount of new business is being placed, but mostly in small lots to cover current needs. Several of the large implement makers recently placed contracts for their supply of implement steels running through third quarter and last half of this year. Prices are only fairly strong, and on small lots are about as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—Makers of wire and wire nails report that specifications against contracts placed before the recent advance of $1 a ton are coming in quite freely, and there is more activity than for some time. As yet very little new business has been placed at the $1.55 basis for wire nails and $1.35 for plain annealed wire, but the larger makers say they are holding to these prices absolutely on all new orders. We quote wire nails at $1.55, plain annealed wire at $1.35, galvanized barb wire and fence staples, $1.95; painted barb wire, $1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55 to $1.60, f.o.b. Pittsburgh, in carload lots.

Nuts, Bolts and Rivets.—Most large consumers have covered through the third quarter and in some cases over the last half. New demand is quiet and mostly for small lots to cover current needs, while specifications are not very active. Discounts on nuts and bolts continue to be more or less shaded, depending on the order and the deliveries wanted, low prices being made on business for prompt shipment. We quote button-head structural rivets in carload lots at 1.50c. and in small lots at 1.60c.; cone-head boiler rivets, 1.60c. in carload lots and 1.65c. in small lots, with terms 30 days net, 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blank and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	$6.00 off list
Hexagon nuts, ⅝ and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Standard Pipe.—Large makers report that new demand for merchant pipe in July is about as heavy as in June. Several large inquiries for line pipe for gas and oil lines are being figured on, one for 54 miles of 16-in. pipe, which may be closed within a short time. New demand for oil country goods is fair, and discounts on merchant iron and steel pipe and oil country goods are being firmly held, but on line pipe low prices continue to be made.

Boiler Tubes.—New demand for locomotive and merchant tubes is only fair, and discounts continue to

be more or less shaded, depending on the order and deliveries wanted by the customer.

Coke.—The local market is dull and prices are lower. Standard makes of blast furnace coke for prompt shipment can be had at $1.75 per net ton at oven, and it is stated that good furnace coke has been offered on contracts over last half of the year at this price. Several furnaces, whose contracts for coke expired on July 1, have decided to buy from month to month in preference to paying prices quoted for coke for last half delivery. We quote standard makes of blast furnace coke for prompt shipment at $1.75 and for delivery over last half of the year at $1.85 to $1.90, although several makers of very high grade furnace coke are still quoting $2 on contracts for the rest of the year. We quote standard 72-hr. foundry coke at $2.25 to $2.35 for prompt shipment, and on contracts, $2.35 to $2.50, all per net ton at oven. The Connellsville, Pa., Courier reports the output of coke in the Connellsville regions for the week ending July 18 as 268,200 tons, an increase over the previous week of 3,595 tons. The Wheeling Mold & Foundry Company is reported to have bought close to 4000 tons of foundry coke for delivery over the next two years, the price being on a sliding scale basis. Another contract for 4000 tons of 72-hr. foundry coke for delivery over the next 12 months is reported closed at $2.50 per net ton at ovens.

Old Material.—The local market is quiet, neither dealers or consumers showing much interest. Dealers that do not have the scrap in stock are afraid to sell short and consumers' stocks are still pretty heavy and they are not inclined to buy until these have been reduced. Several Youngstown consumers have been taking in fair sized lots of scrap lately, and the embargo against scrap for the Youngstown Sheet & Tube Company has been lifted. Prices are only fairly steady. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight, as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.75 to $12.00
Ordinary steel melting scrap	11.50 to 11.75
Compressed side and end sheet scrap	11.00 to 11.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.25 to 14.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	11.25 to 11.50

†Shipping point.

S. Walter Platt, formerly with C. Davis & Co., Pittsburgh, has opened offices in room 616 Oliver Building, Pittsburgh, and will represent in that city the Canton Iron & Metal Company, Canton, Ohio, dealer in iron and steel scrap.

Chicago

CHICAGO, ILL., July 28, 1914.

The increase in steel bookings which has been going on in the past six weeks was accelerated by the sales campaign of price adjustment reported a week ago. The advance to the basis of 1.15c., Pittsburgh, made outstanding quotations $1 a ton lower very desirable and most of the steel companies were able to round up a considerable tonnage that had been hanging fire, as well as to book additional orders and contracts. Contracts on the basis of 1.10c. were limited to August 1 by some of the steel companies, but others extended the period in which specifications will be accepted at the old prices through the third quarter. There has been of course little or no business transacted at the new prices and the test of their strength will not come until later. The mills in this district are operating on heavier schedules and in a general way the third quarter appears to be fairly well provided for at perhaps a 70 to 75 per cent. gait. The pig iron market displays no great vigor, but sales show a somewhat better volume.

Pig Iron.—Makers of pig iron report a steady run of sales, of no very great tonnage individually, but in the aggregate of fair proportions. New inquiries for Northern iron within the past few days total in the neighborhood of 3000 or 4000 tons, none of which inquiries exceeds 1000 tons. An even larger tonnage of Southern iron is also up for figures, but buyers are still considering their purchases in a perfunctory manner and the market lacks inspiration. Reports of Southern sales on the basis of $10 Birmingham continue current, but such evidence as can be substantiated indicates there has been much more Northern iron of Southern analysis sold at $10, Birmingham, than of iron from the South. For Lake irons the furnaces appear to be holding prices quite firmly at the minimum level of $14, f.o.b. furnace. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The recent orders from the Pennsylvania and Rock Island systems are responsible for the increased activity of the Gary mill inasmuch as early deliveries have been specified, particularly in the case of the Rock Island. Sales of about 3000 tons of tie plates are noted and about 5000 kegs of bolts. The demand for track bolts has been sufficiently steady to cause some slowing up in deliveries. We quote standard railroad spikes at 1.50c. to 1.55c. base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Structural lettings reported for the week were of a miscellaneous character and aggregated less than 2300 tons. They included 466 tons for a cotton warehouse at Texas City, Tex., to the Houston Structural Steel Company; 110 tons for a Missouri Pacific bridge, 167 tons for a University of Minnesota gymnasium, 127 tons of bumping posts for the Railway Traction & Supply Company and 100 tons for the Oliver Iron Mining Company, all to the American Bridge Company; 587 tons for the Paducah & Illinois Railroad Company bridge, of which 180 tons was placed with the Chicago Bridge & Iron Company; 175 tons for the United States government at Mare Island, Cal., to the Payment Bolt Works; 275 tons for the Schlessinger office building at San Francisco, to the Ralston Iron Works, and 287 tons for oil tanks for the Anaconda Copper Mining Company, to Riter-Conley Mfg. Company. Most of the steel companies were very active in the two or three days preceding the advance in prices, and a round tonnage for delivery in the third quarter was booked at prices equivalent to 1.25c. and 1.28c., Chicago. With one or two exceptions steel makers took contracts at these prices against which specifications will be received until October 1. There was also a fairly liberal buying of material for stock at the low prices. It is to be expected that little new business will now develop for the remainder of the quarter against which the new prices will be effective. We quote for Chicago delivery from mill for last half shipment, 1.33c.

We quote for structural shapes for Chicago delivery from store 1.75c.

Plates.—Although the bookings intended for general purposes are still light, recent orders from car builders have been sufficiently large to supply local mills with work for the better part of the next 60 days. With the additional buying of cars now in sight, including about 8000 for the Harriman lines which are expected to be closed this week, satisfactory operations into the fourth quarter seem sure. We quote for Chicago delivery from mill, 1.33c.

We quote for Chicago delivery of plates from jobbers' stocks 1.75c.

Sheets.—Prices have not yet followed the advance named for the principal steel products, but on the strength of orders of the past fortnight local mills are predicting a decided stiffening in their quotations. Deliveries continue to be limited by the mills to early shipment. We continue to quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c. to 1.53c.; No. 28 black, 1.93c. to 1.98c.; No. 28 galvanized, 2.88c. to 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.85c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—As a part of the generally increased activity last week heavier bookings of bars are reported and the advance in price has aided materially in clearing up negotiations that have been pending. We quote for mill shipments as follows: Bar iron, 1.05c. to 1.10c.; soft steel bars, 1.25c. to 1.33c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Improvement in the general situation affecting bolts is more apparent from the standpoint of getting consumers under contract than from that of prices. Present quotations should now appear the more advantageous in the light of the new prices for bars. The productive capacity and consumption of rivets are still too radically out of proportion to warrant hope for an early betterment. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; machine bolts up to ⅜ x 4 in., rolled thread, 85-10; cut thread, 85-5; larger sizes, 80-10; coach screws, 85-15; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—Users of wire have been contracting quite liberally on a basis of $1.50, Pittsburgh, for wire nails, most of the makers canvassing their trade very thoroughly preceding the announcement of higher prices. Makers also report a satisfactory volume of specifications. We quote jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.73; painted barb wire, $1.73; galvanized, $2.13; polished staples, $1.83; galvanized, $2.23, all Chicago.

Cast Iron Pipe.—The award of 6500 tons of pipe at Cincinnati was made last week to the United States Cast Iron Pipe & Foundry Company. At St. Paul 600 tons was bought. Tenders are being received to-day at Chicago on 2500 to 5000 tons of 8 to 12-in. pipe and this week figures will be received at Columbus, O., on 1800 tons and at Lincoln, Neb., on 280 tons. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Old Material.—The market for scrap is entirely lacking in feature and except for an occasional inquiry presents few signs of activity. New lists of old material from the railroads offer 2800 tons from the Great Northern, 3500 tons from the Rock Island, 1700 tons from the Santa Fe, 825 tons from the Grand Trunk, 250 tons from the Chicago & Alton and a blank list from the Lake Shore. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft	10.25 to 10.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton	
Iron angles and splice bars	$12.00 to $12.25
Iron arch bars and transoms	12.00 to 12.25
Steel angle bars	8.75 to 9.25
Iron car axles	16.25 to 16.75
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.50 to 9.75
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.75 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.25
Pipes and flues	6.50 to 6.75

Philadelphia

PHILADELPHIA, July 28, 1914.

The bookings by steel mills in eastern Pennsylvania have increased considerably this month, the betterment having begun in June. The total of orders written in the case of one company was nearly 40 per cent. greater on July 18 than on June 1. The unfavorable side is that most of the business was done at rock bottom prices which will not show much profit. The demand upon the mills is spasmodic, despite the better showing, and assurance is not carried far into the future. Pig iron has been more active in nearly all grades, with a good demand especially for low phosphorus, charcoal and Virginia irons. In some cases orders were induced by concessions from already low prices, this being true of Virginia iron in particular. Foundries hereabouts are receiving more orders. Structural material quotations are about the same, despite the recent advance at Pittsburgh and the same is true of plates. Billets show no life. An excellent demand for prompt deliveries in sheets is keeping up. Old material is dull and not much change is looked for in the next few weeks. Heavy melting steel is lower.

Iron Ore.—There are no developments to report. Importations in the week ending July 25 included 15,570 tons from Sweden and 6500 tons from French Africa. A shipment of 1½ tons of molybdenite ore from Germany was valued at $4957.

Pig Iron.—Buying has been more active and conditions are considered a shade better, though a good part of the business has been at lower prices, some sellers having been forced to make concessions to keep their customers from drifting away from them. Salesmen traveling this territory find the foundries somewhat busier. Several kinds of iron figured in the activity of the week, low phosphorus and Virginia foundry iron leading. The former went at full prices, but the latter was sold at 25c. off the price at furnace. There also is good inquiry for charcoal iron and for some specialties. A significant feature of the situation is that in a few instances consumers who caused May shipments on contract to be postponed until the latter part of June not only took the delayed deliveries but in the past few days have bought more iron which they wanted promptly, and more iron has been taken also by firms whose previous talk made it appear that they were well supplied. Sales of standard low phosphorus have run into several thousand tons, divided among different buyers, at prices ranging from $20.50 to $21, delivered. In addition about 2500 tons of copper-bearing low phosphorus was sold at $17.50, furnace. One

interest disposed of 2400 tons of Virginia No. 2 X at $12.50, furnace, equal to $15.30 to $15.50, delivered here, a reduction of 25c., which was entirely due to competition, at least two other sellers having made the lower price. Efforts to dispose of a resale lot of 1000 tons of Virginia iron has resulted in more talk of extremely low prices than has been warranted. The lot is said to have been offered to dealers at $12, furnace, but with poor success in finding consumers who would accept the iron. Inquiries for charcoal iron aggregate about 3500 tons, all for delivery in eastern Pennsylvania, the quantities specified ranging from 400 to 1600 tons and some sales of smaller quantities of this grade have been made. A lot of 1000 tons described as inferior to gray forge was sold at considerably less than $13.75, delivered, according to report as low as $13.50. Two lots of pipe iron, totaling 700 tons, were sold at prices equivalent to $13.75 and $14, Philadelphia. Pipe makers have made several offers to purchase but have named too low a price for acceptance. The purchase of 500 tons of malleable was made at prices reported as exceptionally low. An Eastern sheet and plate mill which has an accumulation of basic as a result of its slower operations of late and from the piling of Sunday iron, would not be averse to selling a few thousand tons. Representatives of a company which is to blow out its last furnace August 1, thereby ceasing production altogether for the time being, give low prices as the cause. The following prices are for standard brands, delivered to buyers' yards in this district:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.30 to 15.50
Virginia No. 2 plain	15.05 to 15.30
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—There has been some light inquiry from local interests. Quotations are unchanged at $38, seaboard, for 80 per cent. English ferromanganese and $37 for German. Ferrosilicon quotations are without change at $71 to $73, Pittsburgh. Importations last week at this port were 551 tons of ferromanganese from England, 30 tons of spiegeleisen from England and 68 tons of ferrosilicon from England. The June importations of iron ore at this port totaled 125,097 tons.

Bars.—Steel bars have shared in the tonnage betterment. Quotations are about the same, but 1.15c., Pittsburgh, or 1.30c., Philadelphia, is more generally asked, and 1.25c. cannot be so readily done on moderate-sized orders. Iron bars are unchanged at 1.17½c. to 1.20c., delivered here.

Structural Material.—Although action on the plant of the Philadelphia Electric Company, heretofore referred to, was supposed to have been postponed indefinitely, it is now reported that Levering & Garrigues have obtained the contract, which will involve about 5000 tons. The extension to the Hotel Traymore has simmered down to about 600 tons of column cores. New work is coming out slowly. There is a report that the Victor Talking Machine Company is planning a new building at its works in Camden. Bids are in on a few small railroad bridges. Stock orders continue slow, but on the whole the tonnage booked shows an improvement over June, as June did over May. Quotations are practically without change, although an order has to be more pleasing to obtain 1.25c., Philadelphia, the mills more generally asking 1.30c.

Plates.—Makers continue to receive many orders for small quantities from many directions, but the aggregate of these is not large. The trade is suffering from a lack of demand from locomotive works and ship yards. As a result of the action of the large interest, there is more of a disposition to ask 1.30c., Philadelphia, and this price is obtained for carloads and 1.33c. for part carloads, but 1.25c. is still possible. As one seller put it, 1.25c., Philadelphia, is now his minimum.

Billets.—Interest in billets continues very slight, so much so that it is difficult to make a price. Local makers are still adhering to $21.90, Philadelphia, as a quotation for open-hearth rolling billets, which is relatively 50c. higher than the Pittsburgh price. Forging steel is $4 to $5 a ton higher.

Sheets.—Mills in this territory are running full, mostly on hurry-up orders, of which they have enough in hand to keep them going for two or three weeks. The makers have been rather surprised by the manner in which the demand improved and is maintained. No. 10 blue annealed are still quoted at 1.50c., Philadelphia.

Coke.—The market has not been especially active, but some small sales have been made. Foundry coke is quoted at $2.40 to $2.70 per net ton at oven for standard grades. Furnace coke is a little weaker, quotations running from $1.70 for prompt and $1.85 for futures, although some makers are holding out for $2 for the latter. Freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Business is dull and not much change is expected until the fall as July and August are normally slow months. Consumers of heavy melting steel are out of the market for the time being and the price is 25c. lower at $10 to $10.50. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$10.00 to $10.50
Old steel rails, rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	14.00 to 14.50
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	9.25 to 9.75
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.25 to 8.75
Railroad malleable	9.00 to 9.50

Buffalo

BUFFALO, N. Y., July 28, 1914.

Pig Iron.—Sales for the week have averaged about the same in volume as the previous week. Orders were principally for third quarter requirements with some tonnage for delivery up to the last of the year. Very little business has been offered or taken beyond January 1. Furnaces generally are holding prices firmly and some sales of No. 2 X foundry are reported at $13.25, furnace. Furnacemen, while not expressing the belief that trade conditions are improving materially, are adhering to the opinion that better prices will be obtainable for the remainder of the year. We quote as follows, f.o.b. furnace, for prompt and last half delivery:

No. 1 foundry	$13.00 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.25
Basic	13.25 to 13.50
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Orders are coming in a little more freely, indicating increasing consumption, the demand for bar material being a little stronger than for plates and shapes. Contracting for the week for tonnages to be used over the third and fourth quarter has also been heavy, buyers evidently realizing that bottom prices have been reached. The 1.10c. base price which was prevalent for a time, prior to last week, has entirely disappeared from this market, and it is understood that all contracts taken were written on a basis of 1.15c., Pittsburgh. It is generally believed that if present conditions continue, there will be a further advance to 1.20c. for fourth quarter specification. One interest states that while bars are being contracted for through fourth quarter, it is limiting deliveries to three months on structural material and plates. Cold rolled steel is quiet, also chain, with no change in prices.

The Lackawanna Bridge Company has taken a contract for 700 tons of steel for an addition to the Richmond, Va., shops of the American Locomotive Company; also 1500 tons for rebuilding the burned plant of the Richardson & Boynton Company at Dover, N. J. The Buffalo Structural Steel Company has contracts for the United Natural Gas Company's office building, Oil City, Pa., and for a theatre and café building at Tonawanda, N. Y., for Ralph S. Brown, each about 100 tons.

Old Material.—There is an active demand for old carwheels and the price for these has advanced. Heavy melting steel, borings and turnings also continue to be leading features of the market, as regards demand and sales. Malleable scrap is a little weaker in price, although not quotably lower. Dealers report the outlook as being a little brighter in the majority of lines, and are not disposed to contract beyond 30 days at offered prices, although consumers are seeking longer deliveries and at prices which dealers are not disposed to make at this time. We quote dealers' selling prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.50 to 13.00
Old iron axles	19.50 to 20.00
Old carwheels	10.75 to 11.25
Railroad malleable	9.25 to 9.75
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.00 to 13.75
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cleveland

CLEVELAND, OHIO, July 28, 1914.

Iron Ore.—The ore market is dragging along with practically no sales. Ore shippers have all they can do to keep their own boats in operation, and there are still too many vessels in commission, although a number have been sent to docks recently. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The market is generally quiet. Some small lot sales of foundry iron are being made for the third quarter and last half delivery. However, many consumers have not used up the iron they purchased for the first half and show no disposition to do any additional buying until their present supplies are consumed. A central Ohio implement manufacturer has placed an order for 500 tons of Northern foundry for the last half. There is no inquiry for steel making iron, but a sale of a 1000-ton lot of malleable is reported. In spite of the limited production in the northern Ohio territory at present, a number of furnaces still have large stocks on hand. Prices are fairly firm and stationary at $13, Cleveland, and Valley furnace, for No. 2 foundry, and $13.50 at local furnace for Cleveland delivery. Southern iron is not active, although a number of sales of lots of 200 tons and under are reported. The $10.25 Birmingham price is being well maintained. We quote, delivered Cleveland, as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.60
Gray forge	13.25
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—A Cleveland interest has purchased 40,000 tons of furnace coke, some for spot shipment and the remainder for delivery during August and September. It claims to have secured standard coke for prompt shipment at $1.70 per net ton at oven. The price for delivery during the next two months was $1.75. Foundry coke is exceedingly dull, following the recent buying movement. Prices for contracts are unchanged at $2.35 to $2.50 per net ton at oven.

Finished Iron and Steel.—The advance in prices of last week has had a stimulating effect on the market in that it has brought out a fair volume of specifications. Some orders, on which quotations were made before the advance and not withdrawn, have been placed. Some business is being done at the new price. Taken altogether the volume of business during July has been considerably larger than in June. The advance of $1 a ton on steel bars, plates and structural material is being maintained by the leading mills. The only weakness is in plates, on which some of the smaller mills are understood to be still quoting 1.10c. The structural situation has improved, but the competition among fabricators remains keen. The McMyler Interstate Company has 1000 tons for Superior viaduct. The McClintic-Marshall Company has 1000 tons for columns for the Bingham warehouse in Cleveland. The contract for 2500 tons of reinforcing bars for this building has not yet been placed. New structural work in prospect for which the contract will be placed shortly is a Chesapeake & Ohio bridge at Sciotoville, Ohio, requiring 7000 or 8000 tons of structural material. The Massillon Bridge & Structural Company has placed with the Jones & Laughlin Steel Company an order for 1500 tons of structural material for the plant of the American Annealing Company in Massillon. There is an inquiry out for 550 tons of reinforcing bars for the new Ford building in Cleveland. Orders placed during the week include one for 1375 tons for standard section rails. Some of the sheet mills are stiffening their prices, but low quotations have not yet disappeared. Black sheets are generally quoted at 1.80c. to 1.85c. for No. 28 and galvanized at 2.80c. to 2.85c. for No. 28, but prices as low as 2.70c. are reported. The demand for bar iron is light with quotations unchanged at 1.20c., Cleveland for local delivery. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—The dead lock between bolt makers and large consumers over contracts has been broken by the agreement of manufacturers to make contracts for delivery during the first half of next year at an advance of 5 to 10 per cent. above current prices. Quite a few contracts have been closed for the last half and the first half. Most of the first half contracts are based on an advance at 7½ per cent. over current prices. Most rivet makers are under contract for the last half. We quote rivets at 1.50c. for structural and 1.60c. for boiler for car lots, but in some cases the regular price on boiler rivets has been shaded $1 a ton. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—No improvement is discerned. Some consumers appear willing to contract for some time ahead at current prices, but not much material is to be had at these prices. The demand for old busheling has improved somewhat, owing to the fact that a local consumer has come into the market and the price has been advanced 25c. a ton. Other prices are unchanged. Local mills will pay $10 to $10.50 for heavy melting steel. Youngstown mills are entirely out of the market. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.00 to 10.50
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.75
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton	
Iron car axles	$18.25 to $18.50
Cast borings	5.25 to 5.75
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.25 to 8.50
No. 1 busheling, old	8.25
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

Cincinnati

CINCINNATI, OHIO, July 29, 1914.—(*By Wire.*)

Pig Iron.—Although the record of the past two weeks shows that there was considerable quiet buying of Southern foundry iron, the present week opens with few inquiries in hand. Some business previously reported is yet to be closed, but sales are now confined to very small tonnages in this immediate territory. There has been no improvement in the melt of foundry iron except with a few foundries which have obtained special contracts resulting in a spurt of activity that is by no means general in its scope. There is considerable comment as to competition from the Lake region furnaces. A limited number of small sales of foundry iron have been made in Indiana and central Ohio that would figure out $13 per ton, Ironton basis, but so far the Hanging Rock makers have been unwilling to meet this competition on either foundry or basic. Southern No. 2 foundry is still to be obtained at $10, Birmingham, for third quarter shipment, although extension of shipments beyond that period is doubtful, except at an advance of from 25c. to 50c. a ton. Most of the business booked in Cincinnati territory has been at $10.25, Birmingham, for prompt shipment, and the asking price is $10.50 for the last quarter. Considering the season and the present low melt, shipments are going forward at a very satisfactory rate, and hold-up requests are comparatively few. Ohio silvery iron is now firm at $16 at furnace, based on an 8 per cent. analysis. Malleable continues very dull, with no business now in sight. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 f'dry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern No. 4 foundry	12.25 to 12.75
Southern gray forge	11.75 to 12.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.45 to 15.95
Southern Ohio coke, No. 2	14.45 to 14.95
Southern Ohio coke, No. 3	14.20 to 14.45
Southern Ohio malleable Bessemer	14.45 to 14.95
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(*By Mail*)

Coke.—A general inquiry for approximately 50,000 tons of coke has been sent out by the United Gas & Improvement Company. This coke will be delivered at the company's plants located in different parts of the country, and the contract is expected to be closed during the next few days. The order will doubtless be divided among different fields, to take advantage of freight rates to the points of destination. There is no inclination on the part of the foundries in this territory to contract ahead. In fact, at the present rate of consumption, most of them have enough bought to run through the year. From $1.70 to $1.95 per net ton at oven is quoted on Connellsville 48-hr. brands, with Wise County and Pocahontas coke quoted 10c. a ton higher. Foundry coke is about the same in all three districts and ranges from $2.25 to $2.65 per net ton at oven.

Finished Material.—Jobbers generally report a slightly better demand all along the line. However, buying is from hand to mouth with the retail trade, but mill agencies continue booking some very nice orders for wire nails, fencing, etc. Although mill prices have advanced slightly, local store quotations on steel bars and small structural shapes remain around 1.75c. to 1.80c. The mill price for both steel bars and shapes is 1.15c., Pittsburgh, for prompt shipment, although on a desirable tonnage this delivery could be extended through the year. Sheets continue to show some improvement, and while new business is confined to prompt shipment orders, there is a noticeable interest taken in future requirements. Both the Newport Rolling Mill Company and the American Rolling Mill Company are holding No. 28 gauge black sheets firm at 1.80c., Pittsburgh basis, and galvanized 2.80c., making the Cincinnati prices 1.95c. and 2.95c. respectively for prompt shipment. Hoops and bands are quiet.

Old Material.—The market continues quiet, with unsteadiness in quotations. The demand from all sources is light, and as dealers' yard stocks are heavy there is no telling what prices would be made on desirable business. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.75 to 12.25
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	10.75 to 11.25
Melting steel rails	9.25 to 9.75
Old carwheels	10.25 to 10.75

Per Net Ton	
No. 1 railroad wrought	$8.75 to $9.25
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.25
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.25 to 11.25
Burnt scrap	6.00 to 6.75
Old iron axles	15.50 to 16.00
Locomotive tires (smooth inside)	9.75 to 10.25
Pipes and flues	6.25 to 6.75
Malleable and steel scrap	7.25 to 7.75
Railroad tank and steel scrap	5.25 to 5.75

Birmingham

BIRMINGHAM, ALA., July 27, 1914.

Pig Iron.—Birmingham district pig iron continues to be sold at $10. It is claimed that not more than one to two dealers are doing this and that the volume of $10 iron booked has not been large. On the other hand, the metal is still obtainable at that figure. Carload lots fetch as high as $10.50 for regular foundry iron and $10.75 has been paid for special grades. Two manufacturers are well sold through October, and it appears that they are not participating in the present low-price activity. One of these sold 3000 tons on the $10.25 basis for last half and another 3000 tons on the same basis in the past week. Consumers are hanging off in the belief, apparently, that $10 iron will become more common. Railroad agents will get together at an early date and arrange tariffs to the North and West under the decision of the Interstate Commerce Commission. It is not anticipated that there will be an appeal from the decision of the commission. Steel making irons are being consumed at a greater rate in Southern territory than for some time, but there is still considerable basic in yards. One interest is reported as having determined to get rid of surplus whether it has to go at $10 or not. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$10.50 to $11.00
No. 2 foundry and soft	10.00 to 10.50
No. 3 foundry	9.50 to 10.00
No. 4 foundry	9.25 to 9.75
Gray forge	9.00 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—The water pipe trade has been given a lift by the resumption of operations at the Chattanooga plant of the United States Cast Iron Pipe & Foundry Company. Orders are slightly on the increase, but prices have not yet reached earlier levels. Western points are considerable takers of Birmingham pipe. The sanitary pipe situation shows a good deal of business going and some price-cutting. We quote per net ton f.o.b. pipe plants as follows: 4-in., $20.50; 6-in. and upward, $18.50, with $1 added for gas pipe.

Coal and Coke.—The large coal mines have taken on considerable activity. Domestic mines are becoming busier. Coke is no longer a burden on the market and is selling at fair prices and in considerable volume, some of it going westward. We quote per net ton f.o.b. ovens as follows: Furnace coke, $2.75 to $2.85; foundry coke, $3.25 to $3.40.

Old Material.—The week has been uneventful. Yards are comparatively well stocked and new material is being taken on with circumspection. The low-priced iron market has a dampening effect. We quote per gross ton f.o.b. dealers' yards as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, Mo., July 27, 1914.

Pig Iron.—Inquiries are largely tentative, having been made so, apparently, by the postponement to October 1 of the effective date of the reduction of freight rates from the Birmingham district. Buying in small lots, however, continues to increase, showing a need of material. Melters are determined, however, to purchase only for immediate needs until the freight rate change takes place. The aggregate of this business is larger from week to week showing that ultimately the demand will come in large tonnages, probably by the beginning of the last quarter if not before. Prices are firmer as a result of the determination of an increasing number of Southern furnaces to take their share of the 35c. accruing from the new freight rates.

Coke.—Orders for coke are for small lots, with no large contracts or inquiries in this territory. For best-selected 72-hr. Connellsville at oven the price is $2.25 for quick delivery and $2.35 for contract delivery. By-product coke is firm at $5.10 to $5.20, St. Louis delivery.

Finished Iron and Steel.—Reports from representatives of finished products are that the aggregate of structural and bar business continues to increase and is running close to 80 per cent of normal, but the large contracts anticipated are not yet coming out. Purchasers are taking the recent advance in prices very satisfactorily and it has caused no cessation of business. The 3000-ton contract for the new bridge at Kansas City as well as the 17,000-ton contract for the Terminal at the same city are reported practically closed but details and successful bidders are withheld. Rail business, standard and light, is practically dead for the moment, and the same is true of plates. Track fastenings are in fair request.

Old Material.—The scrap dealers are optimistic and prices are more firmly held. They are more inclined to put choice lots in the yards and are looking for activity in the very near future. Offers from railroads continue in large lots, the lists out the past week including 15,000 tons from the Baltimore and Ohio and 300 tons from the Chicago and Alton. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$11.00 to $11.25
Old steel rails rerolling	11.25 to 11.50
Old steel rails, less than 3 ft.	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.00 to 11.25
No. 1 railroad heavy melting steel scrap	10.50 to 10.75
Shoveling steel	8.00 to 8.50
Frogs, switches and guards cut apart	10.50 to 10.75
Bundled sheet scrap	5.00 to 5.25
Per Net Ton	
Iron angle bars	$10.00 to $10.50
Steel angle bars	9.25 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.50
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	9.25 to 9.50
Steel couplers and knuckles	9.25 to 9.50
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.75 to 8.00
Mixed borings	4.00 to 4.25
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.25 to 8.75
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 8.00
Pipes and flues	5.75 to 6.25
Railroad sheet and tank scrap	5.75 to 6.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	5.00 to 5.25

New York

NEW YORK, July 29, 1914.

Pig Iron.—The Eastern market has been less active in the past week, though Buffalo furnaces in their own territory have closed a fair amount of business. New England sales include several thousand tons of low phosphorus iron, some further amounts of foundry iron to the General Electric Company and 400 tons of high phosphorus iron to a Connecticut jobbing foundry. In New Jersey an inquiry for 1000 tons is still pending and another lot of about the same size has come up for bids in the past week. In the Trenton district a radiator interest and a foundry devoted to sanitary work have been in the market, together taking upward of 2000 tons. In some cases foundries have been more urgent about shipments, having allowed their stocks to run down close. It appears that foundry operations are, on the whole, a little better than in June, due to the closing of some contracts for castings for the second half of the year. The foundry iron market has developed no strength in any direction, a weakening factor being the willingness of some furnaces to sell far ahead at the low prices developed by the keen competition for comparatively early deliveries. It is understood that some of the 20,000 tons of iron sold by the Dominion Iron & Steel Company for delivery in Eastern districts has been cancelled by arrangement between seller and buyer and in a few cases eastern Pennsylvania pipe iron has been substituted. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.35 to $14.60; No. 2 plain, $14.20 to $14.45. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.50 for No. 2.

Ferroalloys.—Inquiries, especially for small lots of 80 per cent. ferromanganese, are better than they have been for some time but sales are meager. The sale of 200 tons reported last week went to German producers at $37, seaboard, which is the quotation for that product, the English selling at $38, seaboard. Quotations for 50 per cent. ferrosilicon are still reported to be $71 to $73, Pittsburgh, according to the tonnage.

Finished Iron and Steel.—Specifications against contracts are running heavier than in June, but new business for spot shipment is very light. Except in one case the higher level of prices announced a week or so ago has not developed any business, buyers, indeed, remaining as apathetic as ever. In plates, however, one Eastern mill booked a very considerable tonnage at 1.15c., and there are fewer indications that plates remain any weaker than other general lines of finished material. The week has seen quite a long list of closures for fabricated steel and some further car purchases, but the aggregate is not particularly large, nor is there much in the way of encouragement for the immediate future except perhaps more activity in apartment house and other building lines, indicating a more favorable attitude of financial institutions than has prevailed of late. Included among structural awards for apartment houses are the following: 1100 tons, Eighty-sixth street and West End avenue, to the Hay Foundry & Iron Works; 700 tons, 160th street and Colonial Park, to the Hedden Iron Construction Company; 800 tons for three apartments, Seventy-second and Seventy-third streets, to the National Bridge Works; 300 tons, West 123d street, to George A. Just Company; 550 tons, 63 West Thirty-sixth street, to Hinkle Iron Company; 350 tons, 43 East Sixty-second street, to the Hinkle Iron Company, and 500 tons, 146th street and Broadway, to Harris H. Uris Iron Works. In loft and other buildings may be mentioned: 300 tons, First National Bank, Durham, N. C., to Barber & Ross; 800 tons, municipal building, Waterbury, Conn., to Levering & Garrigues Company; 550 tons, Phillips Insulated Wire Company, Pawtucket, R. I., to the Jones & Laughlin Steel Company; 1700 tons, loft, Fortieth street, to the American Bridge Company; 550 tons for the American Locomotive Company, Richmond, Va., to the Lackawanna Bridge Company; 350 tons, several buildings for Amherst College, to Levering & Garrigues Company; 500 tons, Brooklyn Trust Company, to Post & McCord; 700 tons, addition to Transit Building, to Post & McCord; 250 tons for a church and parish house, Syracuse,

N. Y., to Smith & Caffrey, and 700 to 800 tons for the Brooklyn Hospital, to the G. A. Just Company. Railroad lettings in structural steel include 200 tons for the Pennsylvania, 200 tons for a conveying bridge at mines for the Lackawanna, 400 for the Lehigh Valley at Perth Amboy; 1000 tons for the New York Municipal Railways, Brooklyn, this to the McClintic-Marshall Company; 100 tons for the Philadelphia & Reading over the Raritan, to the Pennsylvania Steel Company; 100 tons for the Pennsylvania to the McClintic-Marshall Company, and 400 tons for the Baltimore & Ohio, to the Mt. Vernon Bridge Company. Some of the newer work lately coming into the market embraces 500 tons for a pier shed on the East River for the New Haven; 750 tons of reinforcing material for a covered reservoir at Schenectady; 1000 tons for a highway bridge, Lucerne, Pa.; 1200 tons for the Wheelock Apartment, Thirty-third street; 600 to 700 tons for an apartment house at Fifty-fourth street and Park avenue; 300 tons for a school at West Hoboken, and 300 tons for No. 22 Clinton street building, Newark. There are further inquiries in railroad cars and further purchases. The Pullman Company has taken 110 all-steel cars for the Delaware, Lackawanna & Western, twice the original inquiry, and the same company is to build 40 passenger cars for the Southern Pacific. The Chicago Great Western has placed 500 box cars with the American Car & Foundry Company, and the Toledo & Ohio Central has still further increased its recent purchase of 2500 cars by 1000, half to the Haskell & Barker Car Company and half to the Barney & Smith Company. The Erie is in the market for 600 coal cars; the Minneapolis & St. Louis is expected for 1000 freight cars; the Baltimore & Ohio for 1000 box, 1000 gondolas and 45 passenger equipment (probably for the Cincinnati, Hamilton & Dayton), and the Chilean state railroads are talked of as considering the purchase of 400 freight cars, as is also the Canadian Northern for a large number. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York. We quote iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and structural material at 1.85c. to 1.90c.

Cast Iron Pipe.—Low prices continue to be made in the relatively large competitive bidding, but there is nothing of size before the market at the moment. Bids were taken by Belleville, N. J., on July 28 for 200 tons and a small tonnage will be up for New York City on August 5. We quote carload lots of 6 in. at $20.50 to $21 per net ton, tidewater.

Old Material.—The market grows more unsatisfactory from the standpoint of sellers and conditions are aggravated by rejections. Frequent rain storms have given ground for claims in the case of material like borings and turnings. Melters are taking in very little material and their offers are such as to leave no profit to dealers. A few transactions in wrought pipe are reported at a slight improvement in the prices recently prevailing. Below are given dealers' quotations, per gross ton, New York, and which are largely nominal:

Old girder and T rails for melting	$7.75 to	$8.25
Heavy melting steel scrap	7.75 to	8.25
Relaying rails	20.50 to	21.00
Rerolling rails	10.00 to	10.50
Iron car axles	17.00 to	17.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	10.00 to	10.50
Wrought iron track scrap	8.75 to	9.25
No. 1 yard wrought, long	8.25 to	8.75
No. 1 yard wrought, short	7.75 to	8.25
Light iron	3.25 to	3.50
Cast borings	5.50 to	5.75
Wrought turnings	5.25 to	5.50
Wrought pipe	7.25 to	7.75
Carwheels	9.25 to	9.75
No. 1 heavy cast broken up	10.00 to	10.50
Stove plate	7.50 to	8.00
Locomotive grate bars	6.00 to	6.25
Malleable cast	7.25 to	7.75

The price of cement has advanced 5c. a barrel, making the present range $1 to $1.10 in the territory between Buffalo and North Dakota, the Great Lakes and the Ohio and Missouri rivers. Stocks are relatively small and there is a good demand with excellent prospects.

Boston

BOSTON, MASS., July 28, 1914.

Old Material.—No change is noted in the market. Nothing has occurred to alter the opinion of the dealers that signs are for the better, but no additional tangible evidence of improvement has been received. Naturally the season does not invite any radical change. Prices are as they have been. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to	$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	13.25 to	13.75
Old iron axles	21.25 to	21.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	9.00 to	9.25
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.50 to	7.75
Cotton ties (bundled)	6.00 to	6.25
No. 2 light	3.75 to	4.25
Wrought turnings	5.00 to	5.50
Cast borings	5.25 to	5.75
Machinery, cast	11.25 to	11.50
Malleable	8.00 to	8.25
Stove plate	7.75 to	8.00
Grate bars	5.25 to	5.50
Cast-iron carwheels	11.00 to	11.25

German Conditions Worse

Proposed Syndicates Fail and Prices Fall—Campaign to Lower Pig-Iron Tariff

BERLIN, July 17, 1914.

The failure of last week's negotiations to form a syndicate for the tube industry has been followed by a general change for the worse in the market. Not only have tube prices slumped, but there has been a falling off in other products. Tubes are now already at the level occupied before the temporary agreement which preceded the syndicate negotiations, through which they were raised from 14 to 15 marks ($3.32 to $3.57) per ton.

TUBE AND BAR IRON SYNDICATES FAILURES

The Düsseldorf conference of last week found it impossible to satisfy the demands of the representatives of the Upper Silesian interests. These demanded preferential freight rates and also that domestic and foreign shipments should be separately accounted for, and not lumped, as was desired by the other interests. The Lorraine-Luxemburg interests supported the Upper Silesians, and both insisted, as a further objection to making a final decision at the present conference, that they desired first to wait and see the result of the negotiations for the syndicalization of the other B products. The conference thereupon withdrew the provisional price agreement and adjourned until the latter part of September. Whether the syndicate will be formed before the expiration of the term set appears at best doubtful.

The adjournment is plainly a victory for the Thyssen interests. It will be recalled that Thyssen's consent to participate in the negotiations had been given with the stipulation that his final decision would depend on the success of efforts to syndicalize the other B products. His purpose probably was to gain time for the completion of those of his works which were not yet ready to begin operating to their planned capacity. In his report over his Hagendingen steel works he had significantly complained that these works had received too small a quota of A products when the Steel Works Union was renewed. Plainly he purposed also obtaining a higher quota in the B products. That the upper Silesian representatives should be the ones to render the conference futile is somewhat surprising, in view of the fact that these interests were among the first to support the proposal of the Rhenish Steel Works and to ask from the Steel Works Union the opening of the negotiations.

The same interests were responsible for the failure of the conference, also at Düsseldorf, which was trying to organize the bar-iron interests. The same demands for preferential freight treatment and the keeping separate of domestic and foreign shipments caused an adjournment to be taken, subject to call. It was decided to abide by the already existing agreement that the negotiations shall be abandoned provided no lasting agreement be reached by August 1. The likelihood of the success of the negotiations before that date is, in the circumstances, decidedly questionable.

WIRE AND BAR-IRON PRICES FALLING

The uncertainty attending the efforts to organize the B products has had its effect on the wire market. Consumers, secure in the consciousness that such large stocks are now on hand that all but extraordinary demands can be immediately filled at any time, are entering into no contracts for more than their immediate needs. The shipments of crude rolled wire dropped from 41,590 tons in May to 38,600 in June. Prices in all branches of this industry are highly unsatisfactory. A comparison of prices (in marks per ton) between 1910 and 1914 shows what has happened to the market in the four years covered:

	1910	July, 1914
Rolled wire	127.50	117.50 ($27.96)
Drawn wire	145.00	125.00 to 130.00 ($29.75 to $30.94)
Galvanized wire	175.00	150.00 to 152.50 ($35.70 to $36.29)
Barbed wire	228.00	175.00 to 180.00 ($41.65 to $42.84)
Wire nails	160.00	120.00 to 125.00 ($28.56 to $29.75)

The bar-iron market, which has been almost dormant for months, is becoming even more uncertain. Few contracts are coming in and the prices have reached a level seldom reached before. Losses in this branch in Upper Silesia have been not unimportant and even a voluntary reduction of output has not been able to bring better profits, in the face of sharp competition from the west German works. The extraordinarily cheap transportation facilities by water from west to east Germany make it possible for the western districts to lay their products down at freight rates lower than those from the Upper Silesian districts.

The further existence of the association of German rivet manufacturers is threatened, after its comparatively short existence. The agreement has been denounced as of September 1 by a considerable number of factories because the Thyssen works have been steadily cutting prices and have refused to join the association. It is understood, however, that an agreement has been made for extending the association provisionally until October 15, with a chance that the existing association will then be renewed. Prices remain unchanged at 140 marks ($33.32) per ton.

CAMPAIGN TO LOWER PIG-IRON TARIFF

The Rhenish-Westphalian Gazette reports that an energetic campaign has been begun at Essen for the removal of the tariff on pig iron. The consumers generally consider existing pig-iron prices and prices for semi-finished products as too high in relation to prices for finished products. Only 70.3 per cent. of the pig-iron quotas was shipped in the last half of June, against 78.93 per cent. in May. That the amount called for was limited by actual present needs appears from the fact that stocks have risen very little. They are estimated at roundly 1,017,000 tons, against 1,010,000 tons in May. This amount equals about 63 per cent. of the month's production. The production of foundry, basic and puddling iron is steadily decreasing. The puddling process, it would appear, is gradually being replaced by the open-hearth process.

The Gelsenkirchen Works at Aix-la-Chapelle have started to make band iron in greater quantities. They are offering their product at 109 marks ($25.94), f.o.b. Oberhausen. The last quotations of the association of Rhenish-Westphalian band iron works were 112 to 115½ marks ($26.65 to $27.49). These prices, however, have not been maintained everywhere, especially since competition from south Germany has been sharp. As a result of the new competition the association has decided to permit its members to meet the prices of the Gelsenkirchen concern. Prices for cold-rolled band iron have reached such a low level since the dissolution of the association of German cold rolling mills that the reorganization of that association is being seriously considered. The outcome of these efforts depends on the firm of Thyssen & Co., which demanded and received in the old association about 50 per cent. of the total business. The renewal of the organization for cold-rolled band iron, and, indeed, for all band iron, is also dependent on the success of the efforts to organize the bar-iron industry.

The shipbuilding steel syndicate, after a long price war, has finally reached an agreement which assures the members a sufficient market for at least a year. The prices, however, are very low.

EXPANSION OF THE THYSSEN INTERESTS

The Thyssen interests have entered into a contract for the erection of further plant at Hagendingen, at a cost of about $250,000. Two open-hearth furnaces will be installed, with a capacity of 80 tons each, besides a number of electric steel furnaces of 25 tons capacity.

The pig-iron production of Belgium for the half year just past was 1,233,410 metric tons, compared with 1,222,400 tons in the first half of 1913. It is interesting to note that the chief center of the industry appears to be shifting from Liege to Charleroi. The daily production in the Liege district has dropped to 2376 tons, whereas it is 3875 at Charleroi. The total daily production of Belgium's blast furnaces is 6162 tons, against 6786 at this time last year. Forty-eight furnaces are in blast, against 52 last year.

British Market Still Dull

Foreign and Domestic Politics Affecting Sentiment—Pig-Iron Prices Maintained

(*By Cable*)

LONDON, ENGLAND, July 29, 1914.

Sentiment is unfavorably influenced by Austro-Servian war news as well as by the events in Ulster, but pig-iron prices are maintained owing to the scarcity caused by a reduced output. Semi-finished steel is dull, but a fair line of French sheet bars was sold last week for August to March delivery at 74s. ($18) f.o.b. and 2-in. slabs at 70s. ($17.03) f.o.b. Finished steel is weak on the Continent but prices are not materially changed and British steel prices are unaltered. Furnaces in blast are 150, as compared with 198 a year ago. The stocks of pig iron in Connal's stores are 83,700 gross tons, against 82,893 tons a week ago. The Standard Oil Company has bought small lots of tin plate for the East, paying 12s. 6d. ($3.04) for quarters. The balance of the order was placed in America. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 1½d. ($2.95).

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 2d. ($12.45) as against 51s. 3d. ($12.47) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 6d. ($12.53).

Hematite pig iron, f.o.b. Tees, 59s. ($14.35).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. ($21.89).

Steel bars, export, f.o.b. Clyde, £5 15s. ($27.98).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 10s. ($26.76).

Steel ship plates, Scotch, delivered local yards, £5 12s. 6d. ($27.37).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 7s. 6d. ($40.75).

Steel rails, export, f.o.b. works port, £5 12s. 6d. ($27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.

German sheet bars, f.o.b. Antwerp, nominal.

German 2-in. billets, f.o.b. Antwerp, nominal.

German basic steel bars, f.o.b. Antwerp, 80s. ($19.47), for both prompt and forward.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. ($24.82 to $25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. ($2.19 to $2.43). Iron and steel sheets, 11s. to 12s. 6d. ($2.68 to $3.04). Beams up to 30 ft., 12s. 6d. ($3.04).

Metal Market

NEW YORK, July 29, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
July	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
22	13.75	13.37½	31.70	3.90	3.75	5.05	4.90
23	13.75	13.37½	31.60	3.90	3.75	5.05	4.90
24	13.75	13.37½	31.15	3.90	3.75	5.05	4.90
25	13.50	13.25	30.62½	3.90	3.75	5.05	4.90
27	13.37½	13.12½	30.25	3.90	3.75	5.10	4.95
28	13.37½	13.00	30.87½	3.90	3.75	5.10	4.95

Copper has declined sharply because of the European war situation. Tin has gained strength for the same reason. Lead is unchanged in price, but easier. Spelter has not only held its strength, but advanced. Antimony is without change. The entire market is upset by the bad European situation. If war rages it will cause strength in the metals imported here and weakness in those which we send abroad.

New York

Copper.—In the absence of business, prices have declined steadily because of the bad European outlook. There is no question but that sellers would be glad to sell if they had the chance, but between the lack of need on the part of consumers and their belief in the possibility of lower prices they have not taken hold. There have been some quiet offers of resale lots at less than published prices, but these have not resulted in business, either. The producers are supposed to be adhering to 13.37½c., cash, for electrolytic, but there is no question as to the possibility of obtaining the metal at 13c. Lake is nominal at 13.37½c., though some sellers ask more. The quotations in London this morning are £56 17s. 6d. for spot and £57 for futures. Exports this month have been good, totaling 31,424 tons. The base price of hot rolled sheet copper was reduced July 27 to 18½c. per lb., a decline of ½c.

Tin.—Stirred by foreign advices the market has been more or less excited in the past few days, but nevertheless a fair business has been done. Should a great war sweep over Europe, or even southeastern Europe, it will have a disastrous effect upon tin, it being regarded as not improbable that shipments from Europe may be stopped altogether. Already there have been serious results because of the international money situation, foreign exchange having gone up so rapidly that domestic buyers no longer desire to buy on the sterling basis, as they do not know what they will have to pay when contracts become due and payments are in order. On July 22 and 23 the market was quiet, though on the latter day some stray lots of spot were sold. There was a little business on July 24, with some anxiety to sell, but the total for the day was not large. On Saturday the European war cloud loomed up big, but still the buyers did not take hold. On Monday the market began to hum with interest and uncertainty. Yesterday it was feverish and grave fears were expressed as to future shipments from abroad. Sales of spot were made at various prices ranging up to 31c. At the present moment it is felt that arrivals will meet with a ready sale. The Banca sale of 2300 tons, which was scheduled to take place in Holland to-morrow, has been indefinitely postponed as a direct result of the war scare. London quotations to-day are £135 5s. for spot and £137 10s. for futures. Arrivals this month total 3374 tons and there is afloat 2500 tons.

Lead.—Only a moderate business has been done and prices are unchanged at 3.90c., New York, and 3.75c., St. Louis, though it felt that an offer of 3.72½c., St. Louis, for a desirable quantity would probably be accepted.

Spelter.—Large quantities have been taken in the past few days by the sheet mills and this has caused prices to advance from 5c., New York, to 5.10c., with correspondingly higher prices at St. Louis.

Antimony.—This metal is drifting along unchanged. Quotations are about 7c. for Cookson's, 6.75c. for Hallett's and 5.40c. to 6c. for other grades.

Old Metals.—The market is weak and dealers' selling prices are only nominal, as follows:

	Cents per lb.
Copper, heavy and crucible	12.75 to 13.00
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.50 to 12.00
Clean brass turnings	8.25 to 8.50
Composition turnings	9.75 to 10.00
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	2.85

Chicago

JULY 27.—Lower quotations mark the decided weakness in the copper market, while tin prices have been tobogganing through the greater part of the week with a final slump following on the heels of the war rumors. Spelter producers are stiffening somewhat in their attitude as prices approach their cost line. We quote as follows: Casting copper, 13.50c.; Lake copper, 14c. for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 30.75c.; small lots, 33.75c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.95c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11c.; copper bottoms, 9.75c.; copper clips, 10.25c.; red brass, 10.25c.; yellow brass, 7c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 25c.; block tin pipe, 26c.

St. Louis

JULY 27.—In the metal market the tendency has been toward firmness in prices, but no marked advance. In the Missouri product lead has held steadily at 3.75c., while spelter has been firm at 4.85c.@4.95c., according to delivery. Sales in spelter have been heavy, particulary in futures, probably 6000 tons having been contracted for in the past 10 days. Tin is easy at 31.40c. to 31.70c.; Lake copper, nominal, 14c.; electrolytic copper, 13.85c.; Cookson's antimony, dull, at 7.37½c. to 7.60c. In the Joplin ore market the mine product has stiffened somewhat as a result of the better tendency in spelter and the operation of the mines is much freer. The basis range for zinc blende has been from $37 to $40 per ton for 60 per cent., with the choicest lots selling at $43 per ton on settlement. Calamine has been firm at $20 to $22 per ton for 40 per cent., with the top settlement at $26 per ton. Lead ore sold steadily during the week at $46 per ton for 80 per cent. We quote miscellaneous scrap metals as follows: Zinc, 3c.; lead, 3.25c.; pewter, 21c.; tinfoil, 26c.; tea lead, 3c.

The Baldwin Locomotive Works has received an order from the Chicago, Burlington & Quincy for 15 Santa Fé type locomotives. The Illinois Central is reported to be inquiring for 50 Mikado and a number of Pacific type locomotives, while the Northwestern Pacific is expecting to buy 9 locomotives, Winston Brothers Company of Minneapolis, Minn., 10, and the Atlantic Coast Line a number of mountain and Pacific type locomotives. It is stated that the Chilean State Railways are proposing to buy 125 engines as part of a plan to rehabilitate the railroads of Chile, and that the Russian government is asking prices on a large number of various types of engines.

The bondholders' committee of the Central Iron & Steel Company, Harrisburg, Pa., has given notice that the receivers will not pay the August coupon on the bonds of the company. Low prices and slack demand are given as the causes of the default. The sinking fund provision of the bonds has been in default for more than a year. Charles J. Rhoades, chairman of the committee, said that no early action toward foreclosure was contemplated, as it was believed a moderate improvement in steel prices would lift the company out of its difficulties.

Iron and Industrial Stocks.

NEW YORK, July 29, 1914.

The sudden development of a crisis in the relations of Austria and Servia and the fear that other powers might be involved in the long expected European war sent all prices down on the New York stock exchange Saturday, July 25, and Monday and Tuesday of this week. The declines, however, were less than might have been expected from the panicky condition of European bourses and a condition in Canada which resulted in the closing of the Toronto exchange. The rate decision seemed to have disappeared as a factor in the New York market. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as given below, in practically every case the low price given being reached on Tuesday, July 28:

Allis-Chal., com..	8	- 9	P'gh Steel, pref..	85	- 86
Allis-Chal., pref..	37	- 40	Pressed St'l, com.	38½	- 43⅝
Am. Can, com...	21¾	- 26¾	Pressed Stl., pref.	104	- 104½
Am. Can, pref...	86½	- 90⅝	Ry. Spring, com..	23⅞	- 26⅛
Am. Car & Fdy., com.	46⅛	- 51⅞	Ry. Spring, pref.	90	
Am. Car & Fdy., pref.	117¼	-118⅞	Republic, com...	19⅞	- 22
Am. Loco., com.	25¼	- 29½	Republic, pref...	79⅜	- 84½
Am. Loco., pref..	97	- 97¼	Rumely Co., com.	7⅜	- 10
Am. Steel Fdries.	29½	- 30½	Rumely Co., pref.	22	- 27
Bald. Loco., pref.	107	-107½	Sloss, Com.	22¼	- 26¼
Beth. Steel, com..	35¼	- 41¾	Pipe, com.		9
Beth. Steel, pref.	82¾	- 84	U. S. Steel, com..	55⅜	- 61⅞
Colorado Fuel...	22¼	- 25¼	U. S. Steel, pref.	107⅛	-110½
Deere & Co., pref.		92¾	Va. I. C. & Coke	35	- 40
General Electric.	141¼	-148¼	West'gh'se Elec..	74	- 79¼
Gt. N. Ore Cert.	25	- 30¼	Chic. Pneu. Tool.	51	- 53½
Int. Harv., com.	100	-108	Cambria Steel...	46	- 48⅝
Int. Harv., Pref.		118	Lake Sup. Corp..	13	- 15¼
Int. Harv., Corp.	98	-102	Pa. Steel, pref...	63	- 63½
Int. Harv., Corp., pref.	116⅜		Warwick	9¾	- 10
Int. Pump, com.		3	Cruc. Steel, com.	15⅛	- 15⅞
Int. Pump, pref.		12	Cruc. Steel, pref.	90⅜	- 91¾
Nat. En. & St., com.	9¾	- 10⅛	Harb. Walk Ref., pref.	99	
			La Belle Iron, com.	29	- 30

Dividends Declared

The J. G. Brill Company, regular quarterly 1¾ per cent. on the preferred stock, payable August 1.

The Pressed Steel Car Company, regular quarterly 1¾ per cent. on the preferred stock and ¾ of 1 per cent. on the common. The preferred dividend is payable August 19 and the common September 9.

The Lackawanna Steel Company, regular quarterly 1¾ per cent. on the preferred stock, payable September 1.

The Cambria Steel Company, regular quarterly 1¼ per cent., payable August 15.

The Dominion Steel Corporation, Ltd., regular quarterly 1½ per cent. on the preferred stock, payable August 1.

The International Harvester Company of New Jersey and the International Harvester Corporation, each, regular quarterly, 1¾ per cent. on the preferred stock, payable September 1.

The United States Steel Corporation, regular quarterly, 1¾ per cent. on the preferred stock, payable August 29, and 1¼ per cent. on the common stock, payable September 29.

Bonus Distribution to Employees of Youngstown Sheet & Tube Company

The annual meeting of stockholders of the Youngstown Sheet & Tube Company was held in Youngstown on Tuesday, July 28. The company changed the ending of its fiscal year from June 30 to December 31.

At a meeting of the board of directors held on Friday, July 24, it was decided to give the employees an amount equal to 3 per cent. of their wages for the past year. This applies to all employees, other than officials or professional advisers, who have been in the service of the company since January 1. The amount has been taken from the depreciation account. James A. Campbell, president of the company, states that unless business materially improves in the next year it will be impossible then to make distribution to employees. He said that in the fiscal year closing June 30 the company had earned only sufficient money to pay its regular dividends. The amount to be paid employees as a bonus is $202,630.46, half what was paid last year.

PERSONAL

Church Williams, formely in the open-hearth department of the Illinois Steel Company, South Chicago, Ill., has gone to India to become superintendent of the open-hearth plant of the Tata Iron & Steel Company, Ltd. Fred. C. Bennett, formerly employed in the rail mill of the Maryland Steel Company, Sparrows Point, Md., has also gone to India to become superintendent of the rail mill of the Tata Iron & Steel Company.

Thomas H. Edwards, formerly of the National Tube Company, McKeesport, Pa., has been appointed general superintendent of the Bessemer steel department of the Wheeling Steel & Iron Company, Wheeling, W. Va.

John R. McGinely, Pittsburgh, chairman of the board of directors of the Chicago Pneumatic Tool Company, has sailed for Europe on a business trip.

B. F. Mullen has resigned as superintendent of the blast furnaces of the United Iron & Steel Company at Leetonia, Ohio, and West Middlesex, Pa. He is well known as the inventor of the Mullen gas washer. His first blast furnace connection was as chemist at Hannah furnace, Youngstown, Ohio.

R. T. Crane, Jr., who has been first vice-president of the Crane Company, Chicago, since the death of its founder, Richard T. Crane, is expected shortly to succeed his brother, C. R. Crane, as president of the company. The latter will give attention to a number of interests apart from business.

John C. Davis, dean of the college of engineering of Marquette University, Milwaukee, Wis., has been appointed chief of the Milwaukee bureau of municipal research to succeed Ralph W. Bowman, of New York, who resigned several months ago.

Charles E. Nelson, formerly of Waukesha, Wis., has been elected president of the Prime Steel Company, open-hearth and crucible steel castings, Milwaukee, Wis., to succeed Orton Lee Prime, who resigned July 1 to engage in the railway supply business under the corporate style of Prime Mfg. Company, Railway Exchange Building, Milwaukee.

Paul E. Ryan has resigned as advertising manager of the National Acme Mfg. Company, Cleveland, Ohio, to become general manager of sales of the Osborn Mfg. Company, Cleveland. He will have charge of the sales of the company's line of molding machines, foundry supplies, brushes and also of a new machinery department that will manufacture special machinery for foundry and other purposes. L. E. Honeywell, formerly assistant advertising manager of the National Acme Mfg. Company, has succeeded Mr. Ryan as advertising manager of that company.

A. B. Ross has resigned as general manager of the Clarksburg works of the Phillips Sheet & Tin Plate Company, Clarksburg, W. Va.

B. R. Shover has resigned as general superintendent of the open-hearth plant of the Brier Hill Steel Company, Youngstown, Ohio, effective August 1. He has definite plans for the future, but for business reasons these will not be made public until later. All heads of departments at the Brier Hill plant will, after August 1, report to R. C. Steese, vice-president and general manager.

Henry G. Prout has resigned as head of the Union Switch & Signal Company, and W. D. Uptegraff, for many years connected with the Westinghouse Electric & Mfg. Company, has been elected to succeed him. Theodore W. Siemon has been made treasurer of the company.

O. B. Henderson, for years general sales manager of the Baker Electric Vehicle Company, Cleveland, has become vice-president of the Pacific KisselKar branch, with headquarters at Los Angeles.

The Brown Instrument Company will occupy its new factory at Wayne and Windrim avenues, Wayne Junction station, Philadelphia, about October 1.

OBITUARY

WILLIAM ROBINSON MCILVAIN, retired ironmaster, died July 26 at his residence in Reading, Pa., aged 73 years. He was prominently identified with nearly a score of enterprises in Reading and vicinity. At the time of his death he was vice-president of the Reading Trust Company, the East Reading Electric Company and the Birdsboro Electric Company; president of the Reading Gas Company and the South Reading Market House Company. He was a director of other financial and business enterprises. He was a great-great-grandson of John Morton, one of the signers of the Declaration of Independence. His father at about 1846 at Gibraltar, Pa., formed a partnership with Henry Seyfert in the manufacture of boiler plate iron as Seyfert, McIlvain & Co. The firm continued ten years until the elder McIlvain removed to Reading, where he built the McIlvain mill. The son entered the office of his father and was a member of the firm 40 years until his retirement in 1898. He is survived by his wife and two sons, Edward Morton McIlvain, Lehigh Coke Company, New York, and William McIlvain, who resides in Reading.

W. H. TALLMAN, who died at Wheeling, W. Va., July 22, in his seventy-fifth year, was one of the pioneer iron and steel manufacturers of the Ohio Valley. He and others organized the Ætna Iron and Nut Company in 1872 and he was president of the Ætna Iron & Steel Company as reorganized in 1886, continuing in that office until 1893. He was also one of the founders of the Standard Iron Company. Mr. Tallman retired from active business in 1893 when the Ætna and Standard Steel companies were combined in the Ætna-Standard Iron & Steel Company. He was connected with a number of interests, banking and industrial, in the Ohio Valley, and had much to do with the building up of the steel industry in that section. Mr. Tallman was an uncle of John A. Topping, chairman of the Republic Iron & Steel Company, and Mr. Topping's early connection with the business was in association with the former. Mr. Tallman was a lieutenant in the Union army and served as an adjutant.

EDWARD P. LOY, aged 64 years, died Thursday, July 23, at his home on the North Side, Pittsburgh. He was for some years secretary of the Shoenberger Steel Company, Pittsburgh, until it was taken over by the American Steel & Wire Company. At the time of his death he was engaged in writing a history of the Shoenberger Company. He is survived by his widow, one daughter and one son.

JOHN THOMPSON, founder of the first large plow works in the Middle West, which later become the John Thompson's Sons Company, Beloit, Wis., died at his home in Beloit July 24, aged 86. He was born in Norway and located at Beloit in 1849 and began making plows by hand. He retired from active business in 1900.

ALEXANDER WATSON CADMAN, of the A. W. Cadman Mfg. Company, brass founder, Pittsburgh, died at his home in Edgewood, a suburb of that city, on July 19. His business was one of the oldest brass foundries in Pittsburgh, Mr. Cadman succeeding his father in that business many years ago.

JOHN BENSON PRESCOTT, founder of the J. B. Prescott & Son foundries in Webster and Douglass, Mass., died July 28 after a few days' illness, aged 83 years. He retired about 10 years ago. His wife, one daughter and one son, Jesse B. Prescott, Webster, survive him.

JOSEPH SOISSON, president of the Soisson Fire Brick Company, Connellsville and Bolivar, Pa., and long well known to iron and steel manufacturers of the Middle West, died recently at Connellsville, aged 85 years.

WILLIAM A. MARBACH, president of the Cleveland Metal Stamping Company, Cleveland, Ohio, died July 24, aged 42 years, after an illness of three weeks.

J. WHEELER HARDLEY, 65 years old, secretary and director of the Wolverine Copper Company, died July 21 in Brooklyn, N. Y., after an operation.

WILLIAM CURRY PAGE, president of the Howe Scale Company, of New York, died on June 29.

Book Reviews

Business Administration. By Edward D. Jones. Pages, 275 + VII; 5 x 7 in. Published by the Engineering Magazine Company, New York. Price, $2.

This book is a philosophical consideration of the profession of business administration. It traces the likeness between business administration and military administration, science and diplomacy. It derives from a consideration of history and literature the underlying principles of military administration and traces a parallel between these principles and the principles of business administration. In like manner the author describes the spirit which animates scientific work and shows how this same spirit should animate the work of business administration. Similarly, he develops the ideas and ideals animating the practice of diplomacy and shows how similar ideas and ideals must animate the work of one who attempts to administer an industry.

The author apparently considers the problems of business administration only in the most general terms. He leaves these problems somewhat vague and indefinite in the mind of his readers, and since the successful administrator is a man who must have the most definite and clear cut ideas of what he is doing, it is questionable if many of them will find the book profitable. The typical administrator is practical rather than philosophical. The most ancient history which he recognizes is the history of his own business. Before a general principle of action will appeal to him, it must be shown worked out in a number of specific cases. The author fails to make any specific application of his principles and has very little to say about any particular phase of business or industry.

For one who can assume the philosophic spirit, the book contains many good thoughts. The average foreman or superintendent, however, will have little use for it.

Mechanical Movements—Powers and Devices. By Gardner D. Hiscox, M.E. Fourteenth edition, revised. Pages, 409, 5½ x 9 in. Illustrations nearly 1700. Published by The Norman W. Henley Publishing Company, 132 Nassau street, New York. Price, $2.50.

The title of the book is quite descriptive of its contents and the numerous editions through which it has gone speak for its popularity. The amazing number of illustrations are merely a commentary on the resourcefulness of the late Mr. Hiscox, who compiled several monumental books which represented years of careful collection of data. The present book comprises short illustrated explanatory paragraphs, classified under general headings. The utility of the book is also enhanced by a synopsis of each chapter and, of course, by an alphabetical index.

The Wilson Foundry & Machine Company, Pontiac, Mich., recently incorporated with a stock of $400,000, has fitted up for operation the old plant of the Flanders Mfg. Company. Charles B. Wilson, formerly general manager of the Ferro Machine & Foundry Company, Cleveland, is president and general manager of the company. D. R. Wilson is vice-president and sales manager and C. E. Killinger is secretary and treasurer. Both the latter were also connected with the Ferro foundry in Cleveland. The company will do a gray-iron foundry business, specializing in automobile cylinders.

The State geologist of New York reports that the total iron ore production of the ten companies which carried on mining in 1913 was 1,606,196 gross tons, from which, after mill treatment of the leaner ores, the output was 1,217,899 tons of furnace ore and concentrates, having a value of $3,870,841.

REPUBLIC IRON & STEEL CO.

Financial Statement for the First Six Months of 1914—Surplus Drawn Upon

The semi-annual financial statement of the Republic Iron & Steel Company, issued this week, shows that in the six months ended June 30, 1914, the net profits were $1,033,663. Deducting $414,888 interest on bonds and notes, the net profits applicable to dividends were $618,776. The two quarterly dividends on the preferred stock required $875,000, so that $256,225 was taken from surplus for the payment of these dividends. The net profits in the preceding six months were $1,128,879, or $510,104 more than in the first half of 1914, while those of the first half of 1913 were $1,972,420, or $1,353,645 more. The comparative statement of income for the half year and for the two preceding six months periods is as follows:

	Six months ending June 30, 1914	Six months ending December 31, 1913	Six months ending June 30, 1913
Net earnings from operations, after deducting charges for maintenance and repairs of plants, amounting to: June 30, 1913.....$872,902 December 31, 1913 781,671 June 30, 1914..... 742,099	$1,316,731	$2,181,694	$2,776,647
Interest and dividends received, less interest paid..	5,100	35,158	31,782
Total profit for six months	$1,321,831	$2,216,852	$2,808,429
Less:			
Provision for depreciation and renewal of plants..	$178,882	$317,496	$283,391
Provision for exhaustion of minerals	109,285	128,859	112,145
Provision for possible shrinkage in raw materials		220,000	
	$288,167	$666,355	$395,536
Net profit for the six months	$1,033,663	$1,550,496	$2,412,893
Deduct:			
Interest on bonds and notes	$414,888	$421,617	$440,473
Net profit applicable to dividend	$618,775	$1,128,879	$1,972,420
Add:			
Surplus December 31, 1912			$6,661,478
Surplus July 1, 1913.....		$7,758,898	
Surplus December 31, 1913	$6,512,778		
	$7,131,553	$8,887,777	$8,633,898
Deduct:			
Special appropriations from surplus account.....		$1,500,000	
Dividends on preferred stock	$875,000	$875,000	$875,000
		$2,375,000	
Net surplus carried to balance sheet	$6,256,553	$6,512,777	$7,758,898

The balance sheet shows net current assets on June 30, 1914, of $10,491,968, of which $865,439 was cash. This compares with $13,072,052 net current assets one year previous, of which $3,700,370 was cash.

The current liabilities on June 30 were $2,633,033, against $3,147,517 on June 30, 1913, and the reserve funds included in the statement of liabilities for June 30, 1914, were as follows:

Exhaustion of minerals and mining equipment..	$1,882,190.55
Depreciation and renewal of plants.....	3,066,273.95
Relining and rebuilding furnaces.....	257,906.10
Fire and accident insurance.....	312,885.98
Contingencies	200,586.70
Total.....	$5,719,843.28

The bonded indebtedness on June 30, 1914, was $13,305,000 and collateral notes amounting to $3,000,000. There were outstanding also dividend warrants for $374,316 payable in equal annual installments on October 1, 1914, and 1915.

CHAIRMAN TOPPING ON THE OUTLOOK

The report is accompanied by the following statement by Chairman John A. Topping, in which it will be noticed a favorable view is taken of the prospect for increased business:

"The earnings of the company for the six months' period ended June 30, 1914, emphasize the general effect on business resulting from tariff reductions and trade hesitation, incident to the enactment of new laws and the discussion of radical legislation. As showing to what extent the management of the company were able to adjust operating costs to suit conditions of restricted demand and extreme competition imposed by tariff reductions and other influences, without reducing labor rates, it may be stated that the principal products manufactured by the company were reduced in cost during the past six months, as compared with the costs of the preceding six months' period, by approximately 8 per cent.; the selling prices of the principal products were reduced approximately 20 per cent.; the contraction in volume of business, measured by the company's capacity, was about 33 per cent., and the shrinkage in unfilled orders of finished and semi-finished products, as compared with June 30, 1913, was over 50 per cent. The net earnings of the company for the six months' period ended June 30, 1914, under the conditions stated, necessarily declined, being $1,321,831.12. After all provisional charges and deductions, the net balance applicable to dividends was $618,775.71. This amount fell short of dividend requirements by $256,224.29, which amount was appropriated from previously accumulated profits and applied to dividend account, leaving a net balance to surplus as of June 30, 1914, of $6,256,553.35, and a balance to net working assets of the company as of June 30, 1914, of $10,491,968.46.

"All improvements have been completed and paid for, except small balances on construction account, subject to adjustment. The collateral notes maturing June 2, 1914, were renewed for one year. The outlook for an increased volume of business is favorable. June business shows a large increase over the preceding month, and it is believed that the movement will extend itself on account of the large harvest of wheat under way, and the general excellent prospects for other crops. A return, however, to normal earnings may be slow on account of the low tariff, as values of steel products should, in the future, move more in sympathy with the world's supply and demand, rather than as heretofore with domestic market influences. There are, however, at this time, some indications of improvement in the world's markets, so that there is a prospect of improvement in values."

Orders on hand June 30, 1914, compared with June 30, 1913, and December 31, 1913, were as follows:

Finished and Semi-finished Products

June 30, 1914	214,895 tons
December 31, 1913.....	120,959 tons
June 30, 1913.....	504,928 tons

Pig Iron

June 30, 1914.....	86,992 tons
December 31, 1913.....	49,296 tons
June 30, 1913.....	59,906 tons

The executive committee, as given in the report, now consists of John A. Topping, Grant B. Schley, Leonard C. Hanna, William T. Graham, Earl W. Oglebay and Thomas J. Bray. Mr. Bray's name appears in place of that of James Campbell, as in the report of one year previous.

According to announcement recently made by W. W. Pigott, president of the Pacific Coast Steel Company, Seattle, Wash., the entire plant of the defunct Western Steel Corporation, Irondale, Wash., taken over some time ago by the Pacific Coast Steel Company, will be moved to the Seattle district and operated in addition to the latter company's plant at Youngstown. The Seattle Irondale plant has a capacity of 150 tons per day and the plant at Youngstown 100 tons per day. T. Scott Clingan, manager of the Pacific Coast Steel Company at Seattle, will have charge of the operation.

The statement of idle freight cars for July 15 showed an increase of 6999 on the railroads of the United States and Canada in the half month. The net surplus on July 15 was 226,541 as against 219,542. In the last half of June there had been a decrease of nearly 11,000 cars.

STEEL SCHEDULE, 1914 CENSUS

Suggested Forms for Tin Plate and Wire, Also Cast-Iron Pipe

WASHINGTON, D. C., July 22, 1914.—The tentative schedules for the manufacturing census of 1914, covering establishments engaged in the production of tin plate and terne plate, wire, and cast iron pipe, have been completed by the Census Bureau and are presented below. These constitute the final installment of supplemental schedules relating to the iron and steel industry and will be printed in permanent form at an early date. In the meantime, managers of all establishments embraced in these schedules are requested to examine them with care and forward promptly to the bureau any suggestions as to desired changes. The bureau especially desires suggestions for additions or alterations designed to render the schedules more comprehensive both with regard to equipment and product of establishments in these branches of the iron and steel industry with a view to bringing the new census fully abreast of the best modern practice.

Department of Commerce—Bureau of the Census

TIN PLATE AND TERNE PLATE WORKS, 1914

Supplemental Schedule

Name of Establishment ..
Name of Owner or Lessee ..
Location of Works { State ..... County .....
{ Postoffice ..... Street and No .....

(Establishments operating a rolling mill and tin plate and terne plate works as departments of one establishment, should make separate reports for each department in the General and the respective Supplemental Schedules, reporting in the Supplemental Schedule for Administrative and General Offices the capital, employees and expenses not assignable to any of the plants.

1. Materials used: Give the quantity and cost of the principal materials used during the year, as indicated.
The total cost of all materials should appear only in the General Schedule.

Kind	Department or interplant transfers		Purchased		Total cost
	Pounds	Assigned cost	Pounds	Cost	
Domestic black plates (or sheets) for tinning:					
Steel		$		$	$
Iron—					
Charcoal iron		$		$	$
Other iron		$		$	$

	Pounds	
Foreign black plates (or sheets) for tinning:		
Steel		$
Iron		$
Pig tin		$
Pig lead		$
Terne mixture purchased (proportion of mixture by weight, tin ..... parts, lead ..... parts)		$
Plates for redipping (kind, tin or terne .....)		$

2. Products: Give the quantity and selling value or price at works, and account for all products and by-products of this department manufactured during the year (whether sold or not).
The total value of products in this schedule must agree with the total of the General Schedule.

Kind	Total production (pounds)	Produced for consumption in this establishment (pounds)	Produced for sale	
			Pounds	Value
Tin plates (steel or iron, state kind)				$
Terne plates (steel or iron, state kind)				$
Other sheet iron or sheet steel tinned or terneplated, taggers' tin, etc				$
Plates redipped (kind, tin or terne .....)				$
Stamped ware, tin or terne				$
Copperas				$
All other products, including tin dross, scruff, scrap, etc				$
Amount received for custom work				$
Total				$

3. Equipment of tin plate and terne plate department:
Number of completed tin or terne sets at end of year .....
Number of sets usually employed in coating tin plates .....
Number of sets usually employed in coating terne plates .....
Number of building tin or terne sets at end of year .....

4. Capacity of plant, etc.:
Daily capacity at end of year of tinning department for producing bright tin plates, single turn, in pounds .....
Daily capacity at end of year of terne department for terne (or dull) plates, single turn, in pounds .....
Do you operate your tin-dipping or terne-dipping departments on single, double, or triple turn .....

5. Black-plate department:
Number of completed hot black-plate mills in rolling-mill department at end of year .....
Annual capacity at end of year of completed mills in finished black plates, in gross tons on triple turn .....
Number of completed cold mills in black-plate department at end of year .....
Number of building hot black-plate mills in rolling-mill department at end of year .....
Annual capacity at end of year of building hot black-plate mills in finished black plates, in gross tons, on triple turn .....

6. Remarks: .....

WIRE

Supplemental Schedule

Name of Establishment ..
Name of Owner or Lessee ..
Location of Works { State ..... County .....
{ Post-office ..... Street and No .....

(Establishments operating a rolling mill or wire mill as departments of one establishment, can make one report for the establishment in the General and the respective Supplemental Schedules.)

1. Materials used: Give the quantity (tons of 2,000 lb., unless otherwise indicated) and cost of the principal materials used during the year, as indicated.
The total cost of all materials should appear only in the General Schedule.

Kind	Department or interplant transfers		Purchased		Total cost
	Tons	Assigned cost	Tons	Cost	
Wire rods:					
Steel—					
Bessemer		$		$	$
Basic open-hearth		$		$	$
Acid open-hearth		$		$	$
Crucible and other steel		$		$	$
Iron		$		$	$
Copper		$		$	$
Brass		$		$	$
Other metal (specify):		$		$	$
Wire, plain or coated (not produced in mill reporting)		$		$	$

2. Products: Give the quantity (tons of 2,000 lb. when used) and selling value or price at the works, and account for all products and by-products of this department manufactured during the year (whether sold or not).
The total value of products in this schedule must agree with the total in the General Schedule.

Total production of wire, whether made for consumption or for sale:
Iron and steel wire drawn ..... tons
Copper wire drawn ..... tons
Brass wire drawn ..... pounds
Other metal wire drawn (specify kind): ..... pounds

In securing returns for the manufacturing census of 1914 a special effort will be made to obtain the most accurate data possible regarding equipment and capacity of all establishments. These figures, taken in connection with the actual output reported, have an important bearing on the condition of the industry and the general prosperity of the country. The data will also reflect possibilities for increased production without material increase in capital and will furnish a basis for interesting deductions in the analysis of the returns. The schedules are here given.

	Production—tons: For consumption: Consumed in works	Production—tons: For consumption: Interplant transfers	Production—tons: For sale	Output of works—value: Interplant transfers (assigned value)	Output of works—value: Produced for sale
Iron and steel:					
Wire:					
Plain tons				$	$
Coated tons				$	$
Wire nails and spikes (kegs 100 lb.)				$	$
Wire brads, tacks and staples pounds				$	$
Barbed wire, plain and coated tons				$	$
Wire rope and strand tons				$	$
Woven-wire products, fence and poultry netting, plain or c'o'td. tons				$	$
Other fabricated wire products, including springs, bale ties, cold-rolled flat wire, etc tons				$	$
Copper:					
Wire:					
Bare wire tons				$	$
Insulated wire tons				$	$
Woven-wire products tons				$	$
Other fabricated wire products tons				$	$
Brass:					
Wire pounds				$	$
Woven-wire products pounds				$	$
Other fabricated wire products pounds				$	$
Other metal (specify):					
				$	$
Wire pounds				$	$
Woven-wire products pounds				$	$
Other fabricated wire products pounds				$	$
Total value of interplant transfers				$	$
Copperas (sulphate of iron)			pounds		$
All other products, including wire scrap, spelter scrap, tin and lead, dross, by-products, etc					$
Amount received from custom work and repairing (in wire department)					$
Total					$

4. Equipment of wire works:
Number of wire-drawing blocks; Rod ; Redrawing
Fine wire (below No. 20)
Annual capacity (tons of 2,000 lb.)
Number of wire-nail machines
Annual capacity (kegs of 100 lb.)
Number of woven-wire fence machines
Annual capacity (tons of 2,000 lb.)

CAST-IRON PIPE

Supplemental Schedule

Name of Establishment
Name of Owner
Location of Foundry { State County / Postoffice Street and No

1. Products: Give the quantity and selling value or price at the foundry and account for all products and by-products manufactured during the year for sale (whether sold or not).
The total value of products in this schedule must agree with the total in the General Schedule.

Kind	Quantity (net tons)	Value
Cast-iron pipe and fittings:		
Bell and spigot pipe		$
Flanged pipe		$
Fittings		$
All other castings		$
All other products (specify kind):		$
Total		$

2. Remarks:

The 16-story loft building being erected by the U. T. Hungerford Brass & Copper Company, New York, will, it is expected, be ready for occupancy about November 1. It is situated on Lafayette, Franklin and White streets and faces the new civic centre. A 6-story building at 83 to 85 White street, adjoining the Hungerford building, has been purchased by the company and remodelled for use as a warehouse for surplus stock.

Pittsburgh and Nearby Districts

The Pittsburgh Specialty Mfg. Company, of Pittsburgh, has been chartered with a capital of $50,000 to manufacture and sell malleable cast iron, aluminum and steel castings.

In view of the recent strike at the plants of the Westinghouse Electric & Mfg. Company, East Pittsburgh, figures have been given out showing the volume of orders received and shipments made in the months of April, May and June, the shops operating in April and May without labor troubles of any kind, but affected the entire month of June by the strike. The figures follow:

	Orders	Shipments	force
April	$2,516,700	$2,530,970	8,272
May	2,531,600	3,102,137	8,110
June	2,464,435	2,076,361	.....

Under the very adverse conditions existing in June, shipments in that month were remarkable, but most of them were made from stocks in various district warehouses of the company throughout the country. It is said that orders for the first two weeks in July were much ahead of the same period in June. The June quarter showed shipments of $7,709,468, or at a rate of nearly $31,000,000 per annum. This compares with $43,733,000 for the fiscal year to March 31, or about 70 per cent. of the business last year.

The question of freight rates on wasting or hauling furnace slag in the Pittsburgh and nearby districts will not be settled until after August 15. Railroads serving the Pittsburgh, Wheeling, Mahoning and Shenango Valleys and the Cleveland districts expect to file tariffs on August 15, proposing to charge for the wasting of slag, which heretofore has been disposed of free.

The Mahoning Valley works of the Republic Iron & Steel Company, Youngstown, Ohio, are being dismantled and a good part of the equipment is being shipped to the St. Louis Screw Company, St. Louis, Mo. The shafting department will remain and also the Hannah blast furnace, located near the Mahoning Valley works.

The Keystone Enameling Company, Sharpsville, Pa., has been reorganized and will be known as the Fort Pitt Stamping & Enameling Works. The plant at Sharpsville is to be repaired and put in operation in a short time. The company is controlled by G. E. Abersold, who will be superintendent, and J. C. Bredin, Pittsburgh, who will be business manager.

Amalgamated Association officials of Pittsburgh deny the report that iron workers in Muncie, Ind., are planning to establish a rolling mill there on the co-operative plan. They state that no such project is under way.

The Pittsburgh Plate Glass Company, Pittsburgh, has acquired control of the plant of the Enterprise Glass Company, Sandusky, Ohio, and will make a number of extensions to the buildings and equipment.

Two New River Furnaces at Cleveland

Corrigan, McKinney & Co. have placed with the Variety Iron & Steel Works Company, Cleveland, the contract for building their two new blast furnaces in Cleveland. Work on the second will not be started until the first is finished. The company now operates two blast furnaces at Cleveland, located on the Cuyahoga River.

Brier Hill Plant Under Full Operation

The entire open-hearth plant of the Brier Hill Steel Company, Youngstown, Ohio, containing seven 25-ton open-hearth furnaces, is in full operation, and the Niles and Thomas works which contain 20 sheet mills are also running full with orders ahead for several months.

The largest reported installation of industrial gas in a steel works is being made at the new foundry of Edgar Allen & Co., Ltd., Sheffield, England. A main pipe 16 in. in diameter is required to carry the gas to the works where it will be used in annealing and reheating furnaces and drying ovens as well as in small hardening and forging furnaces.

The Machinery Markets

The country at large shows no tangible improvement in the demand for machinery and equipment, although here and there is a bright spot. Summer vacations, coupled with the usual summer quiet, are having their effect and as a general thing it is the prospects which it is hoped will materialize in the early fall that is buoying up the trade. New York has had a slow week following a rather good one. In Cleveland the dullness is more pronounced than it has been, with new and second hand machinery in about equal demand, but an improved sentiment is noted in some manufacturing lines. Machinery orders in Detroit are few and confined to single tools; jobbing foundries are operating only 40 to 50 per cent. of capacities and a number of large plants are closed temporarily. In Milwaukee the recent improvement has slackened. The export business in machine tools is fairly good in Cincinnati but the domestic business is slow. Outside of agricultural lines the trade in Birmingham is inactive because of the summer season. In the Central South there is a good demand for ice-making machinery, otherwise the trade is depending upon what the future will bring. Orders are coming out slowly in St. Louis, although inquiries have improved and there is an increasing demand for capital. The trade in Texas has been quiet because of disturbing conditions, including the failure of demand to revive in Mexico. In the Pacific Northwest conditions are better in Seattle than elsewhere because of the large amount of building in that city.

New York

NEW YORK, July 29, 1914.

The market appears to be quieter than it was a week ago. At that time several local firms had a fairly good week's business to report and they were of the opinion that the turn toward activity was at hand. Today, however, those same firms say that the week has been a very quiet one. A good part of the trade regards the future hopefully, despite the fact that recent sales have been light. They base their hopes on the considerable number of requirements which have been made known in recent months, but on which no definite action has ever been taken. In addition to the 10 turret lathes which were bought by the Frankford Arsenal, Philadelphia, a few days ago, inquiries are out from the same shops for two double-spindle turret lathes and five small screw machines. Manufacturers have in many cases taken advantage of the slow times to make changes in the personnel of their New York branches, re-arrange their agents' territories and alter other arrangements which they would hesitate to do in busier times.

The Metropolitan Iron Foundry, Metropolitan avenue, near Olive street, Brooklyn, N. Y., has awarded the contract for the erection of a one and two-story brick foundry, 50 x 200 ft., at a cost of about $25,000. E. J. Meisinger, 394 Graham avenue, Brooklyn, N. Y., is the architect.

The Vitagraph Company of America, 116 Nassau street, New York City, has awarded the contract for the erection of a four-story reinforced concrete and brick factory at Locust and Liberty streets, Brooklyn, N. Y. W. L. Stoddard, 30 West Thirty-eighth street, New York City, is the architect.

The Decker Mfg. Corporation, Brockport, N. Y., has been incorporated by C. Decker, H. Holmes and M. M. Decker with a capital stock of $26,200. It will manufacture power sprayers and spray fittings, etc.

The Remington Arms Company, Ilion, N. Y., is receiving bids for erection of a four-story and basement addition, 40 x 128 ft., to be made to its factory. The estimated cost is $60,000.

The Terrace City Machine Company, Inc., Yonkers, N. Y., has filed incorporation papers with a capitalization of $30,000 and will engage in the manufacture of machinery. E. J. Brogan, J. D. Reilley and W. W. Keys are the directors.

Gooley & Edlund, Syracuse, N. Y., manufacturers of milling machines, have let the contract for the construction of a factory at Cortland, N. Y.

The Tracy Development Company, Waterloo, N. Y., of which E. K. Baldwin is secretary, is having plans prepared for a power plant which it will erect in that city.

The E. R. Caldwell & Sons Brass Company, Syracuse, N. Y., has let the contract for the erection of a foundry and machine shop of brick and steel construction on West Fayette street, that city.

Bids will be received until August 8 by the board of trustees, New York State School of Agriculture, Franklin W. Hooper, secretary, 30 Lafayette avenue, Brooklyn, for the construction of a power house for that institution near Farmingdale, N. Y., including boiler plant piping, plumbing and electric work; also for sewage disposal plant and water supply works. Lewis F. Pilcher, state architect, has plans for the work.

The Dunkirk Corporation, Dunkirk, N. Y., capitalized at $30,000, has been incorporated by R. J. Gross, E. K. Buttolph and K. DeH. Caldwell to manufacture motors, engines, machinery, etc. It will take over and continue the operation of the plant of the Motor Mfg. Works, East Second street, Dunkirk, N. Y.

John B. Riley, superintendent of state prisons, Albany, is receiving bids until August 6 for refrigeration equipment, etc., for storehouse for the mess hall and kitchen building at the Great Meadow prison, Comstock, N. Y. Plans have been drawn by state architect Lewis F. Pilcher.

Bids are being received until August 1 by Frank X. Wood, purchasing agent, for a power house and equipment for the Onondaga County Tuberculosis Sanitarium, Syracuse, N. Y. E. E. Palmer is the engineer.

The Ritter Dental Mfg. Company, 610 West avenue, Rochester, will soon let contracts for the construction of a factory on West avenue for which bids have been received. The estimated cost is $26,000.

The Titanium Alloy Mfg. Company, Sugar street and Lafayette avenue, Niagara Falls, N. Y., has completed plans for an addition to be made to its foundry.

The William Rausch Woodenware Company, Buffalo, has been incorporated by W. Rausch, M. E. Rausch and J. W. Bellaire. A factory will be equipped for the manufacture of baskets, woodenware, etc.

The International Acheson Graphite Company, Niagara Falls, N. Y., has let the contract for the construction of a three-story and basement reinforced concrete addition to its factory at Buffalo avenue and the New York Central Railroad to the Turner Construction Company, Prudential Building, Buffalo, at an estimated cost of $35,000.

The Turner Construction Company, Prudential Building, Buffalo, has received the general contract for the construction of a grain elevator and mill of concrete construction to be erected at Prenatt street and the "Nickel Plate" Railroad, Buffalo, by the Ralston Purina Company, St. Louis, at a cost of $100,000.

The American Sawmill Machinery Company, Hackettstown, N. J., is erecting an additional building to its plant in which it will install a sand cleaning equipment for the foundry, at a cost of about $6000.

The borough of Butler, N. J., has voted $30,000 of bonds for the construction of a municipal electric light plant. E. S. Burlison is borough engineer.

The United Indurated Fibre Company, owner of an extensive factory at Lockport, N. Y., has been sold to Philip W. Russell, New York City, representing the H. W. Johns-Manville Company. It is stated that the company will be reorganized with the Johns-Manville Company in control.

The Minck Novelty Corporation, Buffalo, has been incorporated to manufacture special tools and advertising novelties. P. J. Minck, Ellicott Square Building; W. F. Kasting and L. C. Wilkie are the directors.

The Buffalo Labeling Machine Mfg. Company, Buffalo, has been incorporated with a capital stock of $50,000 to manufacture automatic machinery for putting labels on bottles. The managing director is Michael Meyer, 38 East Huron street, Buffalo.

J. T. Lewis & Bro. Company, Lafayette Building, Philadelphia, Pa., has awarded the contract for the repair of damage by fire to its plant at Thompson street, south of Huntingdon, at an estimated cost of $5000, and for the erection of a three-story addition, 48 x 118 ft., to cost about $35,000.

New England

BOSTON, MASS., July 28, 1914.

The normally dullest season of the year has begun, and the mingling of this circumstance with the growing sense of confidence in the future makes it more difficult than ever to judge the actually existing status of the market. If conditions in the way of the volume of orders received have changed, the difference from recent weeks is trifling, taking the average. Still the feeling that the limit of poor business has been reached and that a more prosperous condition is at hand seems to become more nearly universal, though the basis is to a certain degree sentimental, or perhaps theoretical. A correction for the season should be made, and that is difficult to determine. Shop vacations are either in progress or are approaching. Managers and buyers as usual are taking things easy in the hot weather. If any real improvement takes place in the next four weeks it should be regarded as a rare bit of good fortune, because it would mean that business is responding to the better sentiment, in spite of dogdays.

The Chapin-Stevens Company, Pine Meadow, Conn., manufacturer of mechanics' tools, has begun work on an additional factory, 40 x 122 ft.

The Winchester Repeating Arms Company, New Haven, Conn., has awarded the contract for an addition 21 x 45 ft., three stories.

The power plant of the Waypoyset Mfg. Company, Central Falls, R. I., was damaged to the extent of $30,000, July 21.

The Wright Wire Company, Worcester, Mass., is making large additions to its works. The contract has been awarded for the erection of an additional factory building at Worcester, 86 x 130 ft., three stories, which will be connected with the present plant by a steel bridge spanning Hammond street. At Palmer, Mass., the company is erecting an addition, 48 x 120 ft., two stories and basement. Both extensions will be of brick, mill construction.

The plant of the defunct Exeter Machine Works, Exeter, N. H., has been purchased by the Exeter Brass Works, which occupies a portion of the building, and will have the opportunity to extend its works as the need shall require.

The Old Town Canoe Company, Old Town, Maine, will erect an additional factory, about 40 x 250 ft., five stories.

The Manufacturers' Box Company, Auburn, Maine, will erect a large factory for the manufacture of boxes.

The P. J. Flannery Company, New Britain, Conn., manufacturer of plumbers' supplies, will build an addition to its works, 85 x 125 ft.

The Merrow Machine Company, Salem, Mass., which lost its shops in the great fire, has purchased the Gilman-Andrews Company's carriage factory in that city and will occupy it for manufacturing, with the intention of building an addition later.

A. H. Smith, Salem, Mass., will purchase a traveling crane and other iron foundry equipment for the plant which will be erected at Salem to replace that destroyed by the fire. The new building will be about 50 x 100 ft.

Knowlton Brothers, Camden, Maine, machinists and founders, have commenced the erection of a building on Mechanic street which will replace that burned last winter.

The Billings & Spencer Company, Hartford, Conn., has received a large foreign order for drop hammers which will necessitate full time in the company's machine department for some months.

The Ludington Woodenware Company, Ludington, Mich., manufacturer of household woodenware, will build a plant at Wilmington, Mass., to consist of a factory 145 x 186 ft., three stories, a sawmill of two stories, a warehouse of two stories, a boiler house 40 x 44 ft., a machine shop 25 x 40 ft., a tool room, blacksmith shop and offices. J. C. Hopkins, New York City, is the engineer.

Chicago

CHICAGO, ILL., July 27, 1914.

The machine tool trade is still moving very slowly. The general industrial demand has dwindled very close to a minimum. The railroads are increasing the operations of their own shops and taking on more men, which has no more significance than a preparation for the fall traffic. The Illinois Central has closed for a part of its recent list, buying several lathes and a boring mill, making a total purchase of about $12,000. The Chicago & Northwestern was in the market for a few tools during the week. Manufacturers of machinery are running very slack.

The Construction & Engineering Company, Chicago, has increased its capital stock from $10,000 to $100,000; and directors from three to five.

The Hanke Wire & Iron Works, Chicago, has taken out a building permit covering the erection of a one-story shop 50 x 118 ft., at a cost of $8000.

Illinois Metal Company, Plano, Ill., has been incorporated by George E. Mueller, James G. Kellogg and James P. Burke to manufacture metal specialties. The capital stock is $20,000.

The American Packing & Provision Company, whose plant at Kankakee, Ill., was destroyed by fire, has announced its intention of rebuilding as quickly as possible.

The city commissioners, Rock Island, Ill., will shortly ask for bids for a centrifugal pump of 6,000,000 gal. capacity for the waterworks plant. Bids will also be asked for electric, steam and oil-driven machines. R. W. Sharpe is superintendent.

The Rock Island Sand & Gravel Company, Rock Island, Ill., has increased its capital stock from $25,000 to $50,000 to add new equipment.

The Faurel Hill Mausoleum Company, Havana, Ill., has been incorporated with a capital stock of $22,500 by L. G. Pullen, Fred Pollitz and Oscar F. Pfetzing to manufacture mausoleums.

The Chicago & Northwestern Railroad Company is making plans for the installation of an electric pumping system in its division shops at North Fond du Lac, Wis., to replace the present steam equipment.

The McAlester Light & Power Company, McAlester, Kan., has been incorporated with a capital stock of $10,000, by J. B. and W. B. McAlester and E. A. Daniels.

The Warren-Lamb Lumber Company, Rapid City, S. D., suffered the destruction of its planing mill. The damage is estimated at $40,000.

The Russo Beet Harvesting Company, 222 North Union avenue, Pueblo, Colo., has been incorporated with a capital stock of $200,000 by Pasquale Russo and others, to manufacture a patented beet harvesting machine. The machine is being manufactured for the present at the Pueblo Foundry. Stefano Carlino is manager.

Sealed proposals will be received until 2 p. m., August 4, by T. A. Sandbert, purchasing officer of the University of Minnesota, Minneapolis, Minn., for the erection of a cold storage plant at the University Farm.

The Chicago & Northwestern Railroad is contemplating building a 180-car capacity repair yard at Clinton, Iowa, at an estimated cost of about $80,000. There will be one brick veneer mill, 60 x 150 ft., one brick veneer shop, 50 x 100 ft., one frame store, 22 x 150 ft., and one frame lumber shed, 22 x 100 ft.

The Johnson Electric Smelting Company, 18 East Forty-first street, New York City, will build a $75,000 plant at Keokuk, Iowa.

Indianapolis

INDIANAPOLIS, IND., July 27, 1914.

The Anderson Folder Company, Lafayette, Ind., has increased its capital stock from $25,000 to $100,000.

The Planard Company, Kokomo, Ind., has been incorporated with $10,000 capital stock to manufacture metal goods. The directors are W. D. Parr, B. F. Harness and E. R. Anderson.

The Merchants' Harness Company, 1133 Poplar street, Terre Haute, Ind., manufacturer of harness, saddlery hardware, etc., has been incorporated for the manufacture of these lines. R. G. Richardson is president.

A twenty-five-year franchise has been granted by Greendale, a suburb of Lawrenceburg, Ind., to August D. Cook and Cornelius O'Brien, for a waterworks system for the town. The plant, which will include pneumatic tanks, will cost $75,000, it is estimated.

The C. A. Shultz Mfg. Company, Monticello, Ind., is a reorganization of the C. A. Shultz Mfg. Company, Portland, Ore., manufacturer of a patented grain cleaner. It is building factory buildings as follows: A main factory of reinforced concrete construction, 60 x 156 ft.; an office building, 32 x 32 ft., and boiler house of concrete, 32 x 34 ft. It plans the construction of an additional unit next year. The Portland, Ore., plant will be continued and the Indiana factory will be in operation by October 1. R. B. Turner is secretary.

The Goshen Stamping & Brass Company, Goshen, Ind., has been organized with a capital stock of $15,000, to manufacture electrical heating devices. The incorporators are Arthur F. Ernest, Herman Schmidt and Cornelius B. Miller.

Milwaukee

MILWAUKEE, WIS., July 27, 1914.

The improvement noted a week ago continues, but not so rapidly as machinery manufacturers might hope for. In spite of the slow recovery, the feeling is quite optimistic, many builders expressing the opinion that they are glad things are not going backward, which was the rule during the first half of the year. Every little improvement is therefore met with considerable appreciation. Figures collected by the retail merchants division of the Merchants' & Manufacturers' Association show that during the last month there has been an increase of 5 per cent. in the working forces of Milwaukee manufacturing plants. Data compiled on plants engaged in the iron, steel and metal-working plants shows that operations are about 65 per cent. normal, while general manufacturing is from 70 to 75 per cent. normal.

Three machine shop buildings, to be fully equipped with general machine and tool equipment, are included in the plans for the new Milwaukee county house of correction to be erected at North Milwaukee, Wis., beginning August 15. Plans have been completed by Leenhouts & Guthrie, Milwaukee, and call for 12 large buildings, all of steel and concrete construction. The construction work will cost $550,000 alone. An electric power plant, steam heating plant, boiler house, concrete stack, cold storage and refrigerator building, and other structures are specified in the plans. Louis G. Widule is county clerk. Bids will be asked at once.

Bids for the construction of a fireproof appraisers' warehouse costing $75,000 at Milwaukee, Wis., will be taken until August 14 by O. Wenderoth, supervising architect, treasury department, Washington. A considerable mechanical equipment will be required.

The shop and equipment of the G. J. Gollmar Machine Works, Baraboo, Wis., has been purchased by William A. Platt, Baraboo, who intends to make gradual extensions during the next six months.

The Haney-Gasper & White Company, Algoma, Wis., is erecting a machine shop in addition to its garage. It will be equipped with power-driven lathes and tools and will handle motor car repairs and general machine shop work.

The school board, Beloit, Wis., will erect a 32 x 39 x 15 ft. fireproof building for manual training at the high school and is in the market for forges and a small list of electrically-driven machines and tools.

The Kenosha Boiler & Structural Company, Kenosha, Wis., has been incorporated with a capital stock of $10,000 by Frank G. Erickson, William G. Bloxdorf and Albert H. Kluender. It is now engaged in the manufacture of structural iron and steel, and is preparing to greatly enlarge its output of patented steel expansion joint for concrete highway construction.

The Utter & McKelvey Sheet Metal Works, Whitewater, Wis., has dissolved, Mr. Utter retiring. The business will be continued by Mr. McKelvey.

The city of Oconomowoc, Wis., has purchased a site adjoining the present high school and proposes to erect a large addition to house the domestic science and manual training departments. Dr. Russell Jones is clerk.

The Northwestern Fuel Company has purchased a site at Rice's Point, Duluth, Minn., for $125,000, and will erect a concrete and steel coal dock at a cost of $500,000. It will be electrically operated.

The Federal Rubber Mfg. Company, Cudahy, Wis., has not yet placed orders for coal handling machinery for its new factory.

In *The Iron Age* issue of July 23, it was stated that the Automatic Trip Carrier Company, Rice Lake, Wis., manufacturer of stable and barn equipment, was preparing to rebuild its structures destroyed by fire. This statement is incorrect. The company has, however, doubled its capitalization as was stated.

Detroit

DETROIT, MICH., July 27, 1914.

Machinery orders are light and are confined to single tools. Inquiry, too, is light and from scattered sources. Reports from traveling salesmen indicate that the market throughout the state is as lethargic as in Detroit. A number of large manufacturing plants, including the Ford Motor Company, are closed for a week or two for inventory taking, which contributes to the general quiet industrial situation. The demand for second-hand machinery continues slack. No change is reported in the foundry trade, plants being operated at from 40 to 50 per cent. of capacity. Building operations continue to show a decrease.

The Utility Power Company, Detroit, will erect a four-story power building, 98 x 600 ft., to provide quarters for small manufacturing industries. The plans for the new structure which are now being prepared by Preston, Brown & Walker, engineers, provide for considerable miscellaneous equipment.

The States Cyclecar Company of Detroit has been incorporated with a capital stock of $150,000 to manufacture cyclecars and automobile accessories. George W. Meredith, Samuel E. Jones and Victor W. Valade are the principal stockholders.

The Western Gear Mfg. Company, Detroit, has been incorporated with $5000 capital stock by John Swanson, Victor and Oscar A. Palm. It will engage in the manufacture of gears, jigs and tools.

The Detroit Name Plate Etching Company, Detroit, has been incorporated with $7500 capital stock to manufacture small brass goods. Walter J. Reese and J. A. Bardizbanian are the principal stockholders.

The Adrian Steel Casting Company, Adrian, Mich., has increased its capital stock from $30,000 to $40,000 and has acquired the business of the Hobbs Concrete Machinery Company, Detroit. At the annual meeting of stockholders recently a prosperous year was reported and an addition to the foundry authorized.

The Flint Electric Company, Flint, Mich., has completed plans for the erection of a small power plant at Fenton, Mich.

Plans are being prepared for the rebuilding of the plant of the Havers Motor Car Company, Port Huron, Mich. The loss to the plant and equipment has been computed at $125,000.

The Michigan Brass & Foundry Company which will locate in Battle Creek, Mich., will occupy a part of the plant of the A. B. Stove Company temporarily, but it is expected that a factory of its own will be erected this fall.

The Kalamazoo Specialty Company, Kalamazoo, Mich., has been incorporated with $15,000 capital stock to manufacture household utilities. The incorporators are F. H. Clay, C. C. Bob and J. B. Naylor.

The Grand Rapids Chair Company, Grand Rapids, Mich., will shortly increase the size of its plant by adding another story on its present building, which is 60 x 150 ft.

The Bissell Carpet Sweeper Company, Grand Rapids, Mich., will add a line of vacuum cleaners to its products and has acquired a four-story building 50 x 125 ft., adjoining its present plant, to house the new department.

An item in *The Iron Age*, issue of July 23, in which it was stated that the Detroit Insulated Wire Company, Detroit, Mich., has been reorganized following a receivership, is incorrect. This company has never been in the hands of a receiver.

The Seeyle Combination Axe & Tool Company, Sault Ste. Marie, Mich., is about to erect a two-story, 60 x 70-ft. factory, to cost about $15,000.

The city of Wyandotte, Mich., has voted $40,000 of bonds for the improvement of the municipal water works and electric light plant.

Cleveland

CLEVELAND, OHIO, July 27, 1914.

The dullness in the machinery market is more pronounced than for some time. The change for the worst is attributed to the fact that the vacation season is now under way and a large number of buyers are away from their business. The few orders placed with dealers are largely for single tools, there being about as much call for second-hand machinery as for new machinery. There appears to be some improvement in sentiment in manufacturing lines, but few plants report an increased volume of orders. Not much in the way of orders for parts is as yet coming from the automobile manufacturers. An encouraging feature is that there is more work in the way of plant additions and new plants under construction in this city or about to be started than at any previous time during the present year.

The Reliance Gauge Column Company, Cleveland, has commenced the erection of a new plant at 5902 Carnegie avenue, on the site of its old plant, which has been torn down. The new building will be a five-story reinforced concrete structure, 44 x 125 ft., and when complete will largely increase the company's former capacity.

The Holland Trolley Supply Company, Cleveland, manufacturer of electric street railway material and electric equipment for mines, is erecting a three-story brick factory at 1623 East Forty-third street. About 7500 sq. ft. of floor space will be provided.

The F. B. Stearns Company, Cleveland, automobile builder, will enlarge its plant by the erection of a five-story fireproof brick building with about 500,000 sq. ft. of floor space.

The F. P. Henn Company, Cleveland, has been organized with a capital stock of $10,000 by F. P. Henn and others, to deal in engines and motors.

The Ferry Cap & Set Screw Company, Cleveland, maker of cap and set screws, will enlarge its plant by the erection of a three-story building, 40 x 176 ft.

The Lockwood Motor Washer Company, Cleveland, has been formed with a capital stock of $15,000 by H. B. Lockwood and others, to manufacture washing machines.

The City Council, Columbus, Ohio, will authorize an issue of bonds of $18,000 for the purchase of new equipment for the municipal electric light plant.

The Western Reserve Steel Company, Warren, Ohio, has placed the following contracts for equipment for its new plant: Mills and shears to the Hyde Park Foundry & Machine Company, Hyde Park, Pa.; 1600 hp. mill motor for the main mill train to the Westinghouse Electric & Mfg. Company, and in connection with this installation an order for a very large gear drive to the William Tod Company, Youngstown, Ohio. The Riter-Conley Mfg. Company, Pittsburgh, which has the contract for the buildings, started their erection this week. The company expects to have its plant in operation about January 1.

The Akron Slate & Steel Company, Akron, Ohio, has been formed with a capital stock of $10,000 and will engage in a roofing business. It will probably be located in South Akron. D. W. Alexander, W. R. Price, A. L. Woting, and others, are incorporators.

The Wedge Core Company, Akron, Ohio, has been incorporated with a capital stock of $10,000 by John Yemiker, Karl Looker, and others, to manufacture cores.

The Vulcan Carriage Company, Painesville, Ohio, has been incorporated with a capital stock of $1,000,000 to take over the plant of the Vulcan Automobile Company, which it will succeed. It is stated that the capacity of the plant will be increased.

The board of county commissioners, Toledo, Ohio, plan the erection of a heating, lighting and power plant at the Lucas County Children's Home.

The United States Insulator Company, Warren, Ohio, recently incorporated with a capital stock of $450,000, will erect a plant for the manufacture of porcelain insulators for telephone and telegraph wires and high tension electric lines. M. D. Kleimzahler is president.

The Armor Clad Mfg. Company, Canton, Ohio, maker of sheet metal working machinery and sheet metal products, has been incorporated with a capital stock of $50,000 by W. W. Sproul, S. F. Long, and others.

The Reeves Mfg. Company, Canal Dover, Ohio, has installed an addition sheet mill, making six in all. The new mill was placed in operation July 27.

C. F. Miller, Defiance, Ohio, will erect a new plant, 40 x 60 ft., and the manufacture of collapsible crates and other sheet metal products.

The Enamel Products Company, Cleveland, maker of enameled signs, stove parts and other specialties, has acquired a 4½-acre site at Eddy road and Taft avenue, on which it will shortly begin the erection of a one-story vitreous porcelain enameling plant 80 x 200 ft. Plans are being prepared by the Albert M. Allen Engineering Company. W. B. Hickox is president and J. Foster, Jr., secretary and treasurer.

The Horsburgh & Scott Company, Cleveland, maker of gears and pinions, will erect an addition to its plant. Plans are being prepared by the Forest City Engineering Company.

The P. A. Geier Company, Cleveland, manufacturer of special machinery, will enlarge its plant by the erection of a two-story reinforced concrete building.

Cincinnati

CINCINNATI, OHIO, July 27, 1914.

Business men generally are interested in the proposed purchase by the Cincinnati, Hamilton & Dayton Railroad of a large lot of rolling stock. The list issued calls for 45 locomotives, 3000 steel freight cars, 30 steel passenger coaches and 105 cabooses. It is generally believed that the railroads are beginning to wake up and that they will soon issue lists of machine tools that are now badly needed in their shops.

The export business continues fairly good in the machine tool line, and several additional orders were received last week from European customers, but domestic business is very slow. Leading machine tool builders state that the estimate in *The Iron Age* of July 23, showing local plants as operating to about 35 per cent. of capacity, is about correct, but a few call attention to the fact that a considerable number of machines now turned out are being stocked. The final settlement of the carpenters' strike has cleared the labor situation to some extent, but has not stimulated building of manufacturing plants.

Ernest Freund, meat packer, 1215 West Liberty street, Cincinnati, has had plans prepared for an addition to his power plant, and will install a boiler and other equipment.

The Westwood Planing Mill Company, Cincinnati, recently incorporated with $25,000 capital stock, will build a planing mill in the western section of the city.

The J. H. Day Company, Cincinnati, maker of paint and bakers' machinery, contemplates the construction of a larger factory. No building details have yet been worked out.

The Dalton Adding Machine Company, Norwood, Ohio, is moving its machinery into the plant of the Dana Mfg. Company, and expects to be in full operation within 30 days. Much new equipment is being added.

Work on the new reinforced concrete building of the Boss Washing Machine Company, Norwood, Ohio, is progressing at a rapid rate, and the company will be ready to install its machinery about September 1.

The United States Motor Truck Company, Covington, Ky., has increased its capital stock from $25,000 to $300,000, but contemplates no additions to its plant.

The Warman & Wolf Company, Madisonville, Ohio, has made arrangements to move its plant to Covington, Ky. It operates an aluminum foundry, and will increase its capacity at the new location.

The B. G. T. Mfg. Company, Cincinnati, has been incorporated with $15,000 capital stock, to manufacture popcorn fritter machines and other specialties. Nothing is known as to machinery requirements. P. M. Gale is one of the principal incorporators.

The Hamilton Paper Mills Company succeeds the Sterling Paper Company, Hamilton, Ohio. It is reported that the plant will be remodeled and considerable new equipment installed.

The Columbus Mill & Mine Supply Company, Columbus, Ohio, has acquired an additional site adjoining its plant on which will be erected a steel fabricating plant. In the list of equipment to be installed is a five-ton crane.

The South Webster Brick Company, South Webster, Ohio, will rebuild its plant recently destroyed by fire. A. L. Fullerton, Chillicothe, Ohio, is president.

The city of Middletown, Ohio, is contemplating the construction of a new waterworks plant. No plans have as yet been prepared.

The Duplex Mill & Mfg. Company, Springfield, Ohio, has its new foundry now in full operation. W. H. Rayner is president.

The Kyle Mfg. Company, Lancaster, Ohio, has been incorporated with $85,000 capital stock to manufacture stoves. R. C. Kyle is one of the principal incorporators. It already has a foundry at Washington Courthouse, but this will be moved to Lancaster.

The Foley & Robinett Mfg. Company, Circleville, Ohio, has been incorporated with $5000 capital stock to operate a wood-working shop. Only a small amount of equipment will be required. Earl Foley and Dolpha Robinett are the principal incorporators.

The Harmony Piano Company, Evansville, Ind., will erect a piano factory at Aurora, Ind., near Cincinnati. William S. Pritchett, Evansville, is one of the directors.

Wheeling

WHEELING, W. VA., July 20, 1914.

The Builders' Lumber & Supply Company, Charleston, W. Va., was incorporated with $20,000 capital stock by H. T. Miller, T. S. Miller, H. C. Melton, S. R. Atwood and L. Thaxton.

The Capital Flexstone Company, Morgantown, W. Va., has been incorporated with $50,000 capital stock to manufacture composition flooring, etc. The incorporators are Edward F. Kellie, Karl F. Snyder, George G. Gillette, and others, of Columbus, Ohio.

The Central Engineering Company, of Charleston, W. Va., was incorporated with $25,000 capital stock by W. E. Moore, T. S. Clark, W. G. MacCorkle, and others, of Charleston, W. Va.

The Kimball Light & Power Company, Kimball, W. Va., was incorporated with $20,000 capital stock by T. King, G. N. Proctor, J. W. Davey, and others, of Boston, Mass.

The W. R. Johnson Corporation, Crescent, W. Va., has been incorporated with $400,000 capital stock to mine coal, gas and other minerals. The incorporators are S. M. Hitchcock, Buckner Clay, A. C. Collins, and others, of Charleston, W. Va.

The Monongahela Valley Traction Company, Fairmont, W. Va., will install a new power house. Additions to the equipment of the present coal company's power plant at Hutchinson will be made, a new plant will be erected at Hutchinson and repairs will be made to the present plant at Jayenne.

The Central South

LOUISVILLE, KY., July 27, 1914.

Reports from machinery manufacturers and dealers are much more optimistic than they have been, and while the situation has improved largely in the matter of prospects, the chances are that sales will be sufficiently numerous to justify the cheerful view now being taken. Boiler manufacturers are having good trade, and electrical equipment is also moving much better. A feature of the situation is the big demand for ice machines. Ordinarily this is too late in the season to get much business, but the extremely hot weather and the shortage of ice in many communities has resulted in plans being made for enlargements of plants and the establishment of new factories. The general industrial situation in this section is now looking up, and the machinery situation is accordingly materially improved.

The Sampson Engineering Company, Louisville, the organization of which was recently noted, is now equipping a plant in the Snead power building for the manufacture of electric starters and ignition and lighting systems for automobiles. It is in the market for a number of machine tools, including drill presses, turret lathes, multiple drills, grinding machines, etc. Samuel R. Castleman may be addressed.

The Standard Milk Machinery Company, Louisville, has been incorporated with $3000 capital stock and plans to establish a small factory at 1201 West Main street for the manufacture of pasteurizers and bottle-filling and bottle-washing machinery. C. Mortensen, T. J. Hines and J. J. Breman are among those interested.

The Purified Petroleum Products Company, Louisville Trust Company Building, Louisville, is in the market for a 20-hp. motor.

The Progress Laundry Company, Louisville, has let a contract for the erection of a plant at 1716 West Broadway. Eight or ten small motors will be purchased. M. A. Myers, Inter-Southern Building, may be addressed.

The Kentucky Corrugated Paper Company, Louisville, is in the market for a generator and engine, direct connected. George Shumate is in charge.

W. E. Hunter and W. Oliver, Knoxville, Tenn., are planning the installation of a waterworks plant at Dixon, Ky.

Fire at Campbellsville, Ky., recently, burned the garage of Pruitt & Reaser, who lost a number of machine tools which will have to be replaced.

Fire destroyed the sawmill of the J. D. Hughes Lumber Company, High Bridge, near Nicholasville, Ky., with a loss of $50,000.

Both the sawmill and the water plant of Stark & Dodson, Wingo, Ky., were burned with a loss of $35,000.

The Queen & Crescent Route, with general offices in Cincinnati, Ohio, has purchased a block in Ludlow, Ky., where it will establish large shops. The investment will amount to $100,000.

The Kentucky State Board of Control for Charitable Institutions, Frankfort, Ky., will receive proposals until August 3 for mechanical stokers. D. X. Murphy & Brother, Louisville, have plans for the work.

C. B. Crook, Dyersburg, Tenn., is having a garage built, and will shortly be in the market for machine tools for the repair shop.

The Tennessee Marble Corporation, Knoxville, Tenn., which was recently organized with $500,000 capital stock, will develop a property at Neubert Springs, Tenn. R. F. Young is general manager and may be addressed regarding machinery purchases.

The Bristol Machine & Locomotive Works, Bristol, Tenn., is in the market for a 10 x 12-in. air compressor and a planer. C. H. Rhodes is general manager.

Birmingham

BIRMINGHAM, ALA., July 27, 1914.

Machinery dealers do not hide the fact that business has reached the apex of dullness along with the midsummer. The reiterated statement is made that outside of demands from the agricultural trade and structural lines in and near Birmingham, business is stagnant for the time being. Collections, however, are reported as satisfactory, buying appearing to have been on a conservative basis.

A. J. Powers, Mobile, Ala., is organizing a company to manufacture a machine for automatically spreading, floating and finishing concrete pavement.

The Eagle Cotton Oil Mill, Meridian, Miss., will install a battery of boilers, 2500-ton ice storage plant, etc.

The cost of the new power plant for the Georgia School of Technology, Atlanta, Ga., will be $200,000 instead of $100,000 as had been stated. K. G. Matheson, president.

J. S. Moragne, Gadsden, Ga., will establish a lime fertilizer plant near Gadsden.

The Southern Seaboard Lumber Company, Savannah, Ga., has been incorporated with a capital stock of $1,700,000. It is a merger of the Georgia Lumber Company, Georgia-Carolina Lumber Company, and others. M. A. Cheney, Savannah, Ga., is president.

Charles J. Haden, Atlanta, Ga., will establish a brick plant at Rockmart, Ga.

The city of Winston-Salem, N. C., has voted $50,000 of bonds for water works improvements.

The Atlantic Coast Line Railroad Company is constructing a planing mill in connection with its new shops at Florence, S. C. R. E. Smith, Wilmington, N. C., is general superintendent of motive power.

Texas

AUSTIN, TEXAS, July 25, 1914.

Hot, dry weather continues to prevail over most of the state. The political campaign, which has been a disturbing factor to the machinery and tool trade, closed today. The mid-summer trade dullness will probably be over soon. When peace is restored in Mexico many orders for that country will be placed with Texas dealers for machinery of various kinds.

The San Antonio Water Supply Company, San Antonio, Texas, will receive bids until August 3 for two 5,000,000-gal. pumps and steam turbine condensers and for two 250-hp. boilers.

The D. W. Ryan Towboat Company, Houston, which has a capital stock of $50,000, will construct a plant for the building of steamboats.

The Farmers' Gin Company, Bandera, will construct a cotton mill. E. Mansfield is interested.

The Mexia Water, Light & Power Company, Mexia, will construct an electric power plant.

The Frazier Granite Company, Llano, will construct a plant at San Marcos for cutting and polishing granite.

E. G. Hall, Brownwood, is erecting a machine shop and garage.

Contracts will soon be let by the City Council, Sherman, for electric light and power plant improvements to cost $5000.

Phelps-Dodge & Co., which recently purchased the mines of the Tombstone Consolidated Mines Company, Tombstone, Ariz., will install large pumps.

The Southern Arizona Mining & Smelting Company, which has a capital stock of $6,000,000, will take over the holdings of the Imperial Copper Company, the smelter of the Arizona Smelting Company, a controlling interest in the Gila Copper-Sulphide and the Southern Arizona Railroad. It will install a large amount of new machinery at the different mines.

The Uton Lake, Land & Water Company will construct water storage dams and pumping plants near Fort Sumner, N. M., at a cost of about $1,775,000 for the purpose of reclaiming about 80,000 acres of land. M. A. Otero is president.

St. Louis

ST. LOUIS, MO., July 27, 1914.

Conditions in the machine tool market continue to look good, but actual business is still slow, though it shows a slight improvement in both orders and inquiries. Tentative inquiry continues to assure real improvement with the opening of fall. The more positive knowledge that crops are to be good is encouraging dealers. Money has tightened somewhat, showing that the demand for funds for capital expenditure is increasing and all along the line the outlook is reported good. Collections are reported good.

The Missouri Callophone Company, 1208 Fullerton Building, St. Louis, recently reported incorporated, will install three lathes, three drill presses, two milling machines and other equipment for which it is now in the market. C. C. Shafer is president.

The Ford Mfg. Company, St. Louis, maker of roofing materials, has leased a four-story building which it will equip for the extension of its manufacturing department.

The George C. Brinkman Motor Car Company, St. Louis, has increased its capital stock from $15,000 to $50,000, to increase its operations.

The Mississippi Cotton Mills Company, 208 Security Building, St. Louis, of which S. E. Cooper is secretary, has bought the Bellevue Mills, Moorhead, Miss., and will improve it.

The Landau Cabinet Company, St. Louis, will build an addition to its wood-working plant to cost about $50,000, complete.

The Standard Furniture Mfg. Company, St. Louis, suffered a $10,000 loss by fire on its equipment, which will be replaced.

The Faultless Engine Company, Kansas City, Mo., has increased its capital stock from $12,000 to $50,000.

The city of Charleston, Mo., D. W. Joslyn, mayor, will receive bids until August 6 on sewage disposal equipment, including an oil-driven triplex pump. Frank L. Wilcox, St. Louis, is the engineer in charge. Former bids have been rejected.

M. R. Kennedy, Auxvasse, Mo., is in the market for equipment for an electric light plant for public service.

The Adair Drainage District, William Motter, chairman, Kirksville, Mo., will install equipment to run water from the Chariton River through its ditches.

W. A. Trussell, superintendent of the municipal power plant, Kirkwood, Mo., will install two generators, one 100 kw. and one 200 kw., direct connected to engines.

The city of Pattonsburg, Mo., has voted $10,000 bonds for an electric light plant. The mayor is in charge.

The board of education of Kansas City, Mo., will equip a foundry, machine shop, pattern making department, forge and blacksmith shop in the Central High School.

The Aunt Jemima Mills Company, St. Joseph, Mo., will increase the equipment of its corn mill from 1800 bu. to 3000 bu. daily capacity.

The city of Neosho, Mo., under a voted bond issue, will expend $60,000 on additional waterworks plant including a motor-driven centrifugal pump, etc.

The Farmers' Gin Company, Okolona, Ark., has been incorporated with a capital stock of $10,000, by T. M. East, A. G. May and W. C. Hare, and will build a cotton gin.

J. F. Hogan and others have organized as the Lovoca Gin Company, Lovoca, Ark., and will equip a cotton ginnery, for which the machinery will cost about $10,000.

George B. Ewing, McGehee, Ark., and others will equip a cotton gin at a cost of about $10,000.

The Planters Gin & Mercantile Company, Lepanto, Ark., has been incorporated with a capital stock of $15,000 by W. E. Pritchett, W. M. Potter, and others, and will build a cotton gin.

An electric light plant and a waterworks, to cost complete about $40,000, will be equipped at Rison, Ark. Albert C. Moore, Bartlett Building, Joplin, Mo., has been retained as engineer.

The McIntyre Lumber Company, Millville, Ark., has been incorporated with a capital stock of $50,000 by J. F. and R. R. McIntyre and J. D. Burbank.

The board of public works, Paragould, Ark., will receive bids on a waterworks plant extension to cost about $28,000.

The Blytheville Cooperage Company, Blytheville, Ark., of which F. P. Carter is president, will equip an addition to its plant, requiring about $10,000 worth of machinery.

A stave and heading plant of 30,000 pieces daily capacity will be equipped at Kensett, Ark., by the Chess & Wymond Company, Louisville, Ky.

The Inez Mfg. Company, recently reported as intending to equip a cotton mill at Sand Springs, Okla., will invest about $2,500,000 in buildings, machinery, etc. The Commercial Club, Tulsa, Okla., should be addressed.

The Farmers Gin & Grain Company, Boynton, Okla., in which A. C. Trumbo and others are interested, will equip an elevator and a cotton gin and extend the plant of P. B. Wolfinger, recently acquired.

Fire at Guthrie, Okla., destroyed J. S. B. Hall's auto repair plant and August Goos' machine shop. Both will be re-equipped.

The Mosby-Dever Gin Company, Sunflower, Miss., has been incorporated with a capital stock of $10,000 by M. W. Mosby, Jr., L. L. Dever, and others.

The Eagle Cotton Oil Mill Company, Meridian, Miss., will install a battery of boilers, an ice plant and a 2500-ton ice storage plant in its mill.

The Rosa Lumber Company, Picayune, Miss., will rebuild its sawmill and power plant, recently burned with a loss of $20,000.

Conn Brothers, Hattiesburg, Miss., of which A. L. Conn is manager, will install a saw mill of 20,000 ft. daily capacity.

The Chapman Storm Lumber Company, Morgan City, La., will equip a shingle mill of 125,000 daily capacity and is seeking machinery.

Clifford Brooks, Shreveport, La., is interested in the equipment of electric and water power plants involving investment of about $1,000,000, it is stated. Plans are about ready.

The Clavaries Mfg. Company, New Orleans, La., of which A. J. Clavaries is president, will build a factory for the manufacture of isolated lighting plants for plantation use, etc.

The Kimbrough Auto Company, Greenwood, Miss., has been incorporated with a capital stock of $50,000 by W. M. Kimbrough, E. M. Purcell, and others, and will equip a garage and repair plant.

The Frank Jaynes Company, Oak Grove, La., will equip a dry kiln plant of 20,000 ft. daily capacity, including a 50-hp engine, a 125-hp. boiler, etc.

An electric light plant is to be equipped at Winnsboro, La., by Carl Ship, who is in the market for the machinery.

The Hammond Box & Veneer Company, Hammond, La., of which G. G. Bradshaw is secretary, will equip at once a three-story plant, 60 x 100 ft., with new machinery.

The Pacific Northwest

SEATTLE, WASH., July 21, 1914.

Local conditions are better than those prevailing generally throughout the Northwest, the main reason for this being the large amount of building under way and contemplated. As a major portion of the structures being erected are of considerable size, the manufacturers and dealers of heating and other mechanical equipment are benefitting. Some few new hydro-electric plants are contemplated, and these, together with small factories, small mills, etc., furnish some demand for new machinery.

The Puget Sound Navigation Company, Seattle, has commissioned Lee & Brinton to prepare plans for the construction of two passenger boats, to cost about $20,000 each. They will be equipped with 250 hp. engines, either the Diesel type or Talbot superheated steam engines.

The Seattle Port Commission will receive bids until August 20 for the construction of a $250,000 grain elevator to be built on the Waterway. Paul P. Whitham, chief engineer of the commission, has submitted complete plans for the structure.

The Pacific Iron Works, Portland, Ore., of which O. E. Heintz is manager, has practically completed plans for new shops to be built this year in East Portland. Bids for construction work will soon be asked for.

The City Council, Mollala, Ore., has authorized the sale of $10,000 of bonds for the construction of a water system.

The plant of the Crab Creek Lumber Company, North Yakima, Wash., was recently damaged by fire, with a loss of about $40,000. Considerable machinery was destroyed.

The Manufacturers' Association, of Portland, Ore., is authority for the statement that the Electrolitic Gas Company, Dayton, Ohio, has decided to locate a large plant in Portland for the manufacture of oxygen and hydrogen to supply the local trade. A site has already been purchased, and plans for the work practically completed. Construction work will start soon. E. A. Finkenbeiner, Portland, will be manager of the Portland plant.

D. W. Riedle, Roseburg, Ore., plans the installation of a plant for the reduction of lime rock into fertilizer. Plans for the structure are now under way.

The Bismarck and Comly mills, Bismarck, Wash., were both totally destroyed by fire recently, at a loss of $85,000 to the former and $25,000 to the latter. Both plants will be rebuilt.

By the filing of new incorporation papers, the name of the Tillamook Electric Light & Fuel Company, Tillamook, Ore., has been changed to the Coast Power Company. The capital stock of the company has been increased to $50,000.

The Farmers' Elevator Company, Oxford, Mont., has let the contract to Napper & Pearson, Lewistown, Idaho, for the construction of a $10,000 elevator. Specifications include a 10 hp. engine.

The machine shop of George Evans, First, South and Railroad avenues, Seattle, was damaged by fire recently, with a loss of about $2000 to the machinery.

Dr. Rogers, Newport, Wash.; W. P. Frost and J. L. Rodgers, Spokane, Wash., have formed a company which will erect a sawmill near Ione during the summer. It will have a capacity of 35,000 ft. daily.

The White Pine Lumber Company, Spokane, Wash., has announced that it will construct a sawmill with a capacity of 200,000 ft. a day.

Eastern Canada

TORONTO, ONT., July 25, 1914.

The plant of the Canada Steel Goods Company, Hamilton, Ont., will be extended by the erection of rolling mills. New machinery will be added to the plant at once and additional hands will be taken on. This extension is made necessary by the fact that the Stanley Works, New Britain, Conn., has secured an interest in the company. Arthur F. Hatch has been appointed general manager and treasurer.

The Watson Carriage Company's plant at the corner of Murray and Friel streets, Ottawa, Ont., was destroyed by fire. The loss is estimated at $35,000.

Damage to the extent of $300,000 was done by fire to the plant of the Union Drive & Paper Company, Gres Falls, Que.

The Berlin Central Heating Company's plant, Berlin, Ont., has been purchased by a syndicate of Toronto men, headed by C. H. Thompson, who will take charge. The equipment of the plant will be doubled.

The Port Dover Brick & Tile Company, Port Dover, Ont., will rebuild its plant which was recently destroyed by fire. It has asked the Town Council for a loan of $10,000 for ten years.

The Montreal harbor board is preparing plans for the erection of large additions to the No. 1 Elevator, which will give it an additional capacity of 1,500,000 bu. This will bring its capacity up to 4,000,000 bu.

The Cedar Rapids Power & Mfg. Company, Montreal, will erect a mechanical pulp mill to have a capacity of about three times as great as the old one. All the grinders will be run by electricity.

It is announced that the Canadian Steamship Company will purchase Garden Island, at Kingston, Ont., for $125,000, and will erect large ship yards there.

The plant of the Trenton Cooperage Mills, Ltd., Deer River, near Mormora, Ont., was totally destroyed by fire. The loss is estimated at between $10,000 and $12,000.

An item in *The Iron Age*, issue of July 16, to the effect that the mill of the Dalhousie Lumber Company, Dalhousie, N. B., was totally destroyed by fire with a loss of $25,000, is incorrect. The damage was to the plant of the Louison Lumber Company, Jacquet River, N. B.

The Jones Brothers' mill, Apohaqui, N. B., was destroyed by a cloud burst, including some machinery.

The National Steel Car Company, Hamilton, Ont., will build an extension to its passenger car plant.

Damage to the extent of $25,000 was caused by fire in the Canada Cement Company's plant, Hull, Ont.

The Deering Trunk Company will build a new factory at Berlin, Ont.

The Ontario Concrete Post Company, Stratford, Ont., will soon commence the construction of its plant.

J. T. Wing & Co., manufacturer of babbitt metals, packings, etc., will erect a factory on Pitt street, East, Windsor, Ont., to cost $36,000.

Large additions will be made to the factory of Christie & Co. St. John, N. B. New machinery will be required in the extensions.

H. R. Goodday & Co., Ltd., Quebec, Que., has been incorporated with a capital stock of $250,000 by A. C. M. Thompson, W. F Fanning, H. G. Blair, and others, to manufacture lumber, etc.

The Publishing & Printing Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of $300,000 by E. T. Sayers, Felix Barriere, and others, to manufacture wall paper, bags, etc.

The International Lock, Ltd., Ottawa, Ont., has been incorporated with a capital stock of $50,000 by R. W. Dawson, A. E. Thurston, W. L. Chilton, and others, to manufacture safes, deposit boxes, locks, etc.

The city of Listowel, Ont., will install a new pump at its waterworks plant.

The West Lorne Motors, Ltd., West Lorne, Ont., has been incorporated with a capital stock of $50,000 by Malcolm McKillop, D. F. Webster, J. A. McKillop, and others, to manufacture engines, machinery, motors, etc.

The Rocsand Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $100,000 by H. N. Kittson, R. P. McBride, W. Lees, and others, to manufacture and deal in stone, etc.

The Dove Smith Inventions Development Company, Ltd., Niagara Falls, Ont., has been incorporated with a capital stock of $50,000 by O. E. Dores, Sidney Burrowes, A. F. Macintyre, and others, to manufacture machinery, etc.

The Lanspearys, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $200,000 by C. A. Lanspeary, C. L. Lanspeary, Sidney Robinson and others, to manufacture surgical instruments, etc.

Western Canada

WINNIPEG, MAN., July 25, 1914.

Bids will be received by H. H. Elliott, secretary of the town of The Pas, Man., until August 11, 1914, for the supply and delivery of the following machinery and material: Tender A, for the supply and delivery of two sewage lift pumps. Murphy & Underwood, Saskatoon, Sask., are the consulting engineers.

W. Chapman, president of the Turbine Pump Company, Chicago, Ill., announced that his company will erect a factory at Winnipeg, Man., for the manufacture of pumping apparatus and drilling outfits. When completed the plant will employ over 100 men.

Work will be started at once on the construction of the drydock and shipbuilding plant at Vancouver, B. C., for the Dominion Drydock, Shipbuilding & Engineering Company. The machine and boiler shops will be erected first. When completed the plant will have cost $5,000,000.

C. A. Schooley, general manager of the Royal Crown Soaps, Ltd., announced that his company will commence at once the construction of a large plant at Burrard Inlet, near Vancouver, B. C., to manufacture soap. The main building will be 60 x 300 ft., and will cost about $250,000.

The British Columbia Steel Works, Ltd., Bridgeport, Lulu Island, B. C., will soon start the construction of its plant. It will cost $100,000. F. L. Leighton, Vancouver, B. C., and others, are interested.

The Province Grain Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $250,000 by S. T. Smith, W. A. Murphy, C. A. Cawley, and others, to build and operate flour mills, etc.

The sawmill of the New Ladysmith Company, Nanaimo, B. C., was destroyed by fire recently, with a loss of $70,000. The owners state that they will rebuild it at once.

The Morrison Steel & Iron Works, Vancouver, B. C., will erect a branch factory on the Fraser River to supply the trade in that district. E. R. Morrison is president.

The Canada Cement Company, Ltd., Medicine Hat, Alberta, in which Frank P. Jones is interested, is erecting a plant to cost $2,500,000. It will be completed in about a year.

The plant of the Ellison Milling & Elevator Company, McGrath, Alberta, was destroyed by fire recently at an estimated loss of $35,000.

The Peace River Brewing & Malting Company, Vancouver, B. C., will build a brewery to cost $75,000.

The city of Cranbrook, B. C., will build a new waterworks plant to cost $100,000.

The W. G. Scrim Lumber Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $50,000 to manufacture lumber, wood, etc.

The Guildford Island Lumber Company, Wilmington, Del., has been incorporated with a capital stock of $500,000 to erect a plant in British Columbia, for the manufacture of lumber, etc.

The mill of the Salmon River Lumber Company, New Westminster, B. C., which was totally destroyed by fire recently, causing a loss of about $40,000, will be rebuilt at once.

Government Purchases

WASHINGTON, D. C., July 27, 1914.

Bids will be received at the office of the U. S. Marine Corps, Quartermaster's Department, depot of supplies, 1100 South Broad street, Philadelphia, Pa., until August 6, for furnishing and installing one 60-kw. synchronous motor direct-connected to a three-wire 125-250-volt direct current, 35 kw. generator.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until August 11, for furnishing air compressors under schedule 7003, steam engineering, class 1, bid A, duty paid; bid B, the same, duty free, for Brooklyn.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until August 11, schedule 7072, for four vertical receiver type steam separators and trap for Key West; until August 18, schedule 7083, for furnishing and installing one 400-sq. ft. surface condenser, with wet vacuum pumps and piping, for Narragansett Bay; schedule 7084, for one motor-driven horizontal screw type broaching machine and spare parts for Norfolk; schedule 7085, for one electrically driven pipe-expanding machine, complete with motor and controller devices, for Brooklyn; until August 25, schedule 7081, for 26 3-hp., 220-volt turret-turning motors, with equipment and spare parts, for Brooklyn.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

CARRIER'S LIABILITY FOR DELIVERY WITHOUT BILL OF LADING.—A manufacturer who shipped a machine "shipper's order," under a contract entitling the buyer to two days' trial, and who indorsed the bill of lading in blank to a bank, is not entitled to hold the railroad company liable in damages for delivering the machine to the buyer without surrender of the bill of lading, where delivery was made on telephone order from the bank. (Iowa Supreme Court, Famous Mfg. Company vs. Chicago & Northwestern Railway Company, 147 Northwestern Reporter 754.)

DAMAGES FOR DEFICIENT PERFORMANCE OF MACHINERY SALES CONTRACT.—No hard and fast rule can be laid down for measuring the damages recoverable from a seller for defects in machinery installed by him. Much depends upon the facts and circumstances of each particular case, and the character of the machinery and the use to which it was intended to be put. If the machinery is so affixed to the building in which it is installed, that it cannot be removed without damage to the building, or without great expense, and if it answers the general purpose for which it was intended, though defective in some respects, the damages recoverable are to be measured by the excess of the value of the machinery contracted for over the value of the machinery actually installed. (Pennsylvania Supreme Court, Otis Elevator Company vs. Flanders Realty Company, 90 Atlantic Reporter 624.)

REMEDY ON BREACH OF WARRANTY OF PIPE.—When a sale of pipe has been completed by the buyer's acceptance of delivery and he has used it, it is too late for him to rescind the purchase on account of any breach of warranty as to the quality of the pipe; his only remedy is a claim for damages measured by the excess of the value of the pipe as it was represented to be over its actual value, in the absence of a showing that larger damages were sustained as a direct consequence of the breach of warranty. (West Virginia Supreme Court of Appeals, Eagle Glass & Mfg. Company vs. Second Hand Pipe & Supply Company, 81 Southeastern Reporter 976.)

WHEN TITLE DOES NOT PASS TO BUYER ON DELIVERY.—Where a sale of goods is for cash the title does not pass, if the purchase money be not paid in accordance with the terms of the sale, unless the seller manifests an intention to permit title to pass. But, by permitting the goods to remain in the buyer's hands he runs the risk of a third person becoming an innocent purchaser from the original buyer, in which case right to reclaim the goods would be lost. (St. Louis Court of Appeals, Skinner & Kennedy Stationery Company vs. Lammert Furniture Company, 166 Southwestern Reporter 1079.)

DUTY TO SAFEGUARD MACHINERY IN KENTUCKY.—There is no requirement in Kentucky by statute, as there is in several other States, that revolving belts and gears shall be guarded, and, hence, it is not unlawful to operate machinery without such guards, but in a suit for injury to an employee, the jury may find that under the circumstances of the particular case the employer was guilty of actionable negligence in failing to provide a guard. (Kentucky Court of Appeals, Job Iron & Steel Company vs. Layne, 166 Southwestern Reporter 978.)

WHEN EMPLOYER IS NOT LIABLE FOR ABSENCE OF SAFEGUARD.—An iron company which had provided a proper safeguard for cogwheels is not liable for injury to an employee, sustained while the safeguard was removed, if the company had no actual or constructive knowledge that the guard was not in place. (Pennsylvania Supreme Court, Snyder vs. Longmead Iron Company, 90 Atlantic Reporter 630.)

DELIVERY OF WASHED COAL UNDER CONTRACT OF SALE.—Unless a contract to sell nut and slack for fuel contemplates use of the coal in an automatic stoker, there is no implied warranty on the part of the seller that the coal will be dry so as to be available for such use, and, hence, delivery of washed coal of the quality called for by the contract of sales does not constitute a breach of the contract on the seller's part. (West Virginia Supreme Court of Appeals, Buffalo Collieries Company vs. Indian Run Coal Company, 81 Southeastern Reporter 1055.)

MINNESOTA WORKMEN'S COMPENSATION LAW UPHELD.—July 3 the Minnesota Supreme Court handed down a decision sustaining the validity of the provisions of the compensation act adopted by the Legislature of that State in 1913.

WARRANTIES IMPLIED IN SALE OF MACHINES.—Where a machine is manufactured for a certain purpose, the manufacturer or a dealer, in selling it, impliedly warrants that it is reasonably well adapted to that use, but there is no implied warranty that it is as good as other makes of the same kind of machine. If the buyer retains the machine longer than a reasonable time in which to discover any imperfections in it, he waives any right to repudiate his purchase on account of its failure to work properly. (Texas Court of Civil Appeals, A. S. Cameron Steam Pump Works vs. Lubbock Light & Ice Company, 167 Southwestern Reporter 257.)

CONCLUSIVENESS OF FINDINGS OF INDUSTRIAL ACCIDENT BOARD.—Under the Massachusetts workmen's compensation act, a finding by the Industrial Accident Board on a fact concerning an injury is conclusive, if supported by evidence, although the evidence may be conflicting on the point. (Massachusetts Supreme Judicial Court, in re Burns, 105 Northeastern Reporter 601.)

INSOLVENT CORPORATION'S PURCHASE OF STOCK.—Holders of stock in an insolvent corporation who sell their shares to the company knowing its financial condition, may be held liable to the corporation's creditors for the amount of assets thus wrongfully received by them. (Alabama Supreme Court, Sherrill vs. Hutson, 65 Southern Reporter 538.)

PENALTY FOR FAILING TO ADJUST FREIGHT LOSS CLAIM.—The Minnesota statute enacted in 1913, subjecting railway companies and other common carriers of freight to a penalty of $25 for failure to adjust a freight loss claim within 60 days, and imposing a like penalty against a shipper for presenting a fraudulent claim, is constitutional. (Riskin vs. Great Northern Railway Company, 147 Northwestern Reporter 960.)

STOWAGE OF DISTINCT LOTS OF SCRAP IRON FOR TRANSPORTATION.—An owner of vessels chartered to carry scrap iron, separated by the shipper according to grades, is liable for damages sustained by the latter in consequence of mixture of the grades in stowage aboard the vessels, in violation of a general custom at the point of shipment, requiring carriers by vessel to stow distinct lots of scrap iron separately. (United States District Court, Eastern District of Pennsylvania; The F. J. Luckenbach; 213 Federal Reporter 670.)

INDIVIDUAL LIABILITY OF OFFICERS ON CORPORATE NOTE.—Officers who signed a note as president and treasurer of a manufacturing corporation with their official titles following their names, are not personally liable on the note, if they were authorized to execute it on the part of the corporation. (Massachusetts Supreme Judicial Court, Jump vs. Sparling, 105 Northeastern Reporter 878.)

SELLER'S RIGHT TO RECOVER GOODS FOR FRAUD.—When goods are purchased by an insolvent person with intent not to pay for them, the seller, by acting promptly, will be entitled to recover possession of the goods, even though they were sold on credit. But he has the burden of establishing fraudulent intent on the buyer's part, which is not to be inferred from the mere fact of the buyer's insolvency and concealment thereof from the seller. (Indiana Appellate Court, Scandinavian-American Trading Company vs. Skinner, 105 Northeastern Reporter 784.)

RIGHT TO MATERIALMAN'S LIEN.—One who furnishes structural steel for an improvement of real estate made by a lessee under a lease entitling the landlord to retain the improvement has a right to en-

force a mechanic's lien against the premises, if it appears that the improvement was made with the consent of the owner. (New York City Court, Empire City Iron Works vs. Margolies, 148 New York Supplement 348.)

DAMAGES FOR REFUSING SHIPPING FACILITIES.—An owner of a manufacturing establishment situated along the right-of-way of a railway company is entitled to recover damages sustained by him through arbitrary refusal of the company to furnish cars for the shipment of his product, and to place them on a sidetrack near his plant. (Georgia Court of Appeals, Atlantic Coast Line Railroad vs. A. T. Snodgrass & Co., 82 Southeastern Reporter 153.)

EMPLOYER'S DUTY CONCERNING TOOLS AND APPLIANCES.—When tools or appliances have been generally used in an industry and have been found to be reasonably safe, negligence of the employer in failing to adopt safer implements cannot be predicated upon the fact that such implements are in use in some plants. (New York Court of Appeals, Paul vs. Consolidated Fireworks Company, 105 Northeastern Reporter 795.)

STOCKHOLDER'S RIGHTS CONCERNING DIVIDENDS.—Although a stockholder is not entitled to recover a dividend until one has been declared by the corporation, he is entitled to maintain suit to recover for the benefit of the stockholders in general net earnings distributed by the directors among themselves under the guise of additional salaries. (New York Court of Appeals, Godley vs. Crandall & Godley Company, 105 Northeastern Reporter 818.)

Trade Publications

Machinery Safeguards.—Bass Bros., 82 Walker street, New York City. Pamphlet. Lists a line of safeguards for various wood and metal working machines. The guards for the most part are made of wire mesh and completely protect dangerous portions of such machines as circular saws, shaping and jointing machines, band saws, stamping presses, etc. Illustrations and brief descriptions of the devices are included.

Iron Workers' Machinery.—Excelsior Tool & Machine Company, Thirtieth street and Ridge avenue, East St. Louis, Ill. Catalogue. Pertains to a line of high speed labor saving machinery that includes shears, punches, presses, brakes, grinding, polishing and buffing machinery, etc. For the most part a separate page is given to each machine and an engraving of it is presented, together with a description and condensed table of specifications. Among the machines covered are a line of belt-driven swing frame grinding and polishing machines, which were illustrated in *The Iron Age*, February 27, 1913. A list of the various towns and cities in which the company's machines are used is given, together with considerable useful information and shop hints.

Sheet Metal Working Machines.—George C. Keene & Co., Cincinnati, Ohio. Collection of circulars. Embody illustrations and brief descriptions of a line of sheet metal working machinery that includes forming, double corrugating, curving and forming, punching, shearing and bending machines. A separate circular is devoted to each, and in addition to the illustration a brief description with a condensed table of specifications is given.

Compression Wrench.—Lutz-Webster Engineering Company, Philadelphia, Pa. Circular. Contains an illustration and a brief description of a compression wrench designed for general use on all rough or finished round surfaces. The special advantage claimed for this wrench is that positive continuous movement is secured without marring or slipping, even on greased surfaces. Illustrations of a line of compression ratchets and bolt and nut sockets, which can be supplied are included. An illustrated description of the wrench appeared in *The Iron Age*, April 16, 1914.

Structural and Plate Workers' Tools.—Cleveland Steel Tool Company, Cleveland, Ohio. Catalogue No. 6. Refers to a line of structural and plate workers' tools and includes punches of various sizes and shapes, dies, rivet sets, scissors, etc. All of these are illustrated and tables of prices and dimensions are included.

Blue Printing Machines.—Revolute Machine Company, 417 East Ninety-third street, New York City. Pamphlet. Lists a line of blue printing, washing, drying and ironing machines for use in connection with continuous rolls or separately cut sheets. A brief description of the operation of the line of printing machines is given, followed by brief descriptions with illustrations and condensed specification tables of the several styles. In all of the machines the paper to be printed is laid on the surface of a revolving glass cylinder, with the tracing to be printed between the paper and the glass. The washing, drying and ironing machine, which can be used not only with continuous rolls but also with separately cut sheets, is made in two styles, either with or without the tank. Views of both machines are presented, together with brief descriptions of their construction and operation.

Oxy-Acetylene Welding and Cutting.—Superior Oxygen Company, 2515 Liberty avenue, Pittsburgh, Pa. Pamphlet. Treats of the subject of oxy-acetylene welding from a practical and technical standpoint, the chapters dealing with elementary welding and cutting not being intended to cover the subject exhaustively, but to give the shop practice in the various branches. The subjects covered include acetylene generators, oxygen cylinders, character of the flame, application of the blowpipe, welding and cutting different materials and a brief statement of the various features to be taken into consideration in designing a house for acetylene generators.

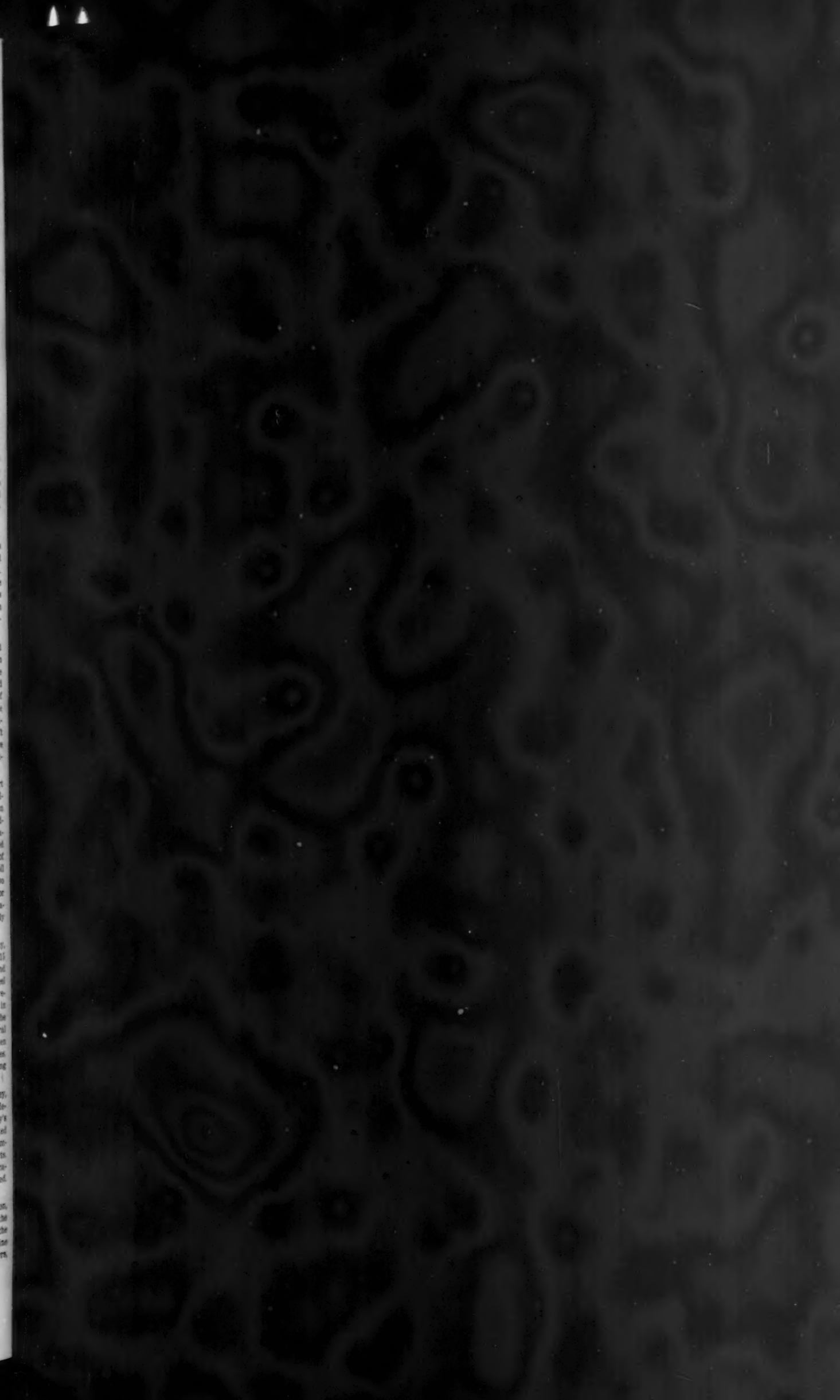
Tool Steel.—Halcomb Steel Company, Syracuse, N. Y. Brochure. Illustrates the use of Ketos tool steel for a great variety of tools. The brochure is quite different from the pieces of regular trade literature in its make up, and in connection with the illustrations of tools and special test pieces produced by manufacturers and the Government from this steel, data are presented on the piece illustrated, together with the name of the company employing it. The tools illustrated include stocks, dies, hobs, clutches, steel shell rolls, etc. Instructions on the forging and heat treating of the steel are included.

Flexible Shaft.—Stow Mfg. Company, Binghamton, N. Y. Catalogue No. 14. Size, 6 x 9 in.; pages, 96. Relates to a flexible shaft which enables power to be transmitted to tools in the most convenient position for their operation. A brief description of the shaft with illustrations of the several parts is given, followed by a number of illustrations of various types of drilling and grinding machines that can be used in conjunction with the shaft. A complete telegraph code and a comprehensive index are included.

Case Hardening Compound.—Kasenit Company, 11 Water street, New York City. Circular. Deals with an open fire case hardening compound which is made in the form of a powder. It can be used on all classes of steel and cast, wrought or malleable iron without the employment of any special equipment. The compound melts under moderate heat and spreads itself over the entire surface to be hardened, thus forming a shell and eliminating the danger of soft spots or tendency to warp. Two grades of compound are made for open fire hardening and another for pack hardening in ovens.

Oil Filters, Exhaust Heads and Ventilators.—Burt Mfg. Company, Akron, Ohio. Catalogue. Describes and illustrates the company's line of Cross, American and Warden oil filters, the Burt oil filtering system, the Burt and Standard exhaust heads and the Burt ventilators and combination skylight and ventilators. Considerable space is devoted to the subject of factory ventilation with illustrations of plants equipped with Burt ventilators. A double unit oil filter which is designed for use in power plants where two kinds of oil are to be filtered, is listed in the catalogue for the first time. The units are entirely independent in operation, so that two grades of oil can be filtered simultaneously in the one filter.

Well Drilling Machinery.—Leidecker Tool Company, Marietta, Ohio. Catalogue I. This is the company's 1915 catalogue, describing and illustrating a line of oil, gas and artesian well drilling machines, which are built with steel frames. The illustrations of the different machines are presented first, followed by the descriptive matter, and this in turn is succeeded by a series of line drawings showing the various parts, numbered to correspond with a list. General dimensions of important parts of the machines are given in connection with a list of tools used with the various sizes. A series of illustrations showing special and regular drilling and fishing tools of all kinds, are included.

Cranes.—Whiting Foundry Equipment Company, Harvey, Ill. Catalogue No. 110, superseding No. 82. Briefly describes and illustrates the latest features of the company's line of cranes. Views of actual installations are presented to show the wide field that is covered, together with a number of views of the several cranes and their various parts. In connection with the installation views, data on the location of the crane and the service required of it are included. A partial list of users is included.

Blower.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Gives a few of the advantages of the company's turbo undergrate blower. An illustration of the device, which as its name indicates, is a small steam turbine directly connected to a blower for furnishing air for boilers, is included.